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CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

600



Canada



CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

600 - INTERPRETATION

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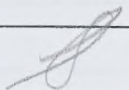
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	PMT 12/1/01	100.00	200.00
	PMT 12/1/01	100.00	300.00
	PMT 12/1/01	100.00	400.00
	PMT 12/1/01	100.00	500.00
	PMT 12/1/01	100.00	600.00
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	PMT 12/1/01	100.00	1900.00
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PART VI - GENERAL OPERATING AND FLIGHT RULES

600.01 *Interpretation*

In this Part,

“ADIZ” or “Air Defence Identification Zone” means the airspace that extends upward from the surface in those areas of Canada and off the coasts of Canada, the boundaries of which are specified in the *Designated Airspace Handbook*; (*ADIZ ou zone d’identification de défense aérienne*)

“aerial application” means the seeding from an aircraft or the spraying or dusting of chemicals from an aircraft, or any other operation of a similar nature; (*traitement aérien*)

“aerial inspection” means the inspection from an aircraft of crops, forests, livestock or wildlife, the patrolling of pipelines or power lines, a flight inspection or any other operation of a similar nature; (*inspection aérienne*)

“AX class”

~~[Repealed 2006/06/30]~~

“large aircraft” means an aeroplane having a maximum permissible take-off weight in excess of 5 700 kg (12,566 pounds) or a rotorcraft having a maximum permissible take-off weight in excess of 2 730 kg (6,018 pounds); (*gros aéronef*)

“police authority” means the Royal Canadian Mounted Police, Ontario Provincial Police, Sûreté du Québec or Canadian Coast Guard, or any municipal or regional police force established pursuant to provincial legislation. (*corps policier*)



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CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

601 - AIRSPACE

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PART VI - GENERAL OPERATING AND FLIGHT OPERATIONS

SUBPART 1 - AIRSPACE

DIVISION I - AIRSPACE STRUCTURE, CLASSIFICATION AND USE

Airspace Structure

601.01 (1) Controlled airspace consists of the following types of airspace:

(a) the Arctic Control Area, Northern Control Area and Southern Control Area;
(amended 2006/06/30)

(b) high level airspace;
(amended 2006/06/30)

(c) high level airways;

(d) low level airspace;
(amended 2006/06/30)

(e) low level airways;

(f) fixed RNAV routes;
(amended 2006/06/30)

(g) terminal control areas;

(h) military terminal control areas;
(amended 2006/06/30)

(i) control area extensions;
(amended 2006/06/30)

(j) transition areas;
(amended 2006/06/30)

(k) control zones;
(amended 2006/06/30)

(l) restricted airspace;
(amended 2006/06/30)

(m) advisory airspace;
(amended 2006/06/30)

(n) military operations areas; and
(amended 2006/06/30)

(o) danger areas.

(amended 2006/06/30)

(2) Uncontrolled airspace consists of the following types of airspace:

(a) high level airspace;

(amended 2006/06/30)

(b) low level airspace;

(amended 2006/06/30)

(c) high level air routes;

(amended 2006/06/30)

(d) low level air routes;

(amended 2006/06/30)

(e) fixed RNAV routes;

(amended 2006/06/30)

(f) restricted airspace;

(amended 2006/06/30)

(g) advisory airspace;

(amended 2006/06/30)

(h) military operations areas; and

(amended 2006/06/30)

(i) danger areas.

(amended 2006/06/30)

(3) The horizontal and vertical limits of any type of airspace referred to in subsection (1) or

(2) are

(amended 2006/06/30)

(a) in the case of a high level air route, a low level air route and an uncontrolled fixed RNAV route, those specified on an aeronautical chart; or

(amended 2006/06/30)

(b) in any other case, those specified in the *Designated Airspace Handbook*.

(amended 2006/06/30)

(4) The *Designated Airspace Handbook* shall specify the geographical location and the horizontal and vertical limits of

(amended 2006/06/30)

(a) Canadian Domestic Airspace;

(amended 2006/06/30)

(b) Canadian minimum navigation performance specifications (CMNPS) airspace;

(amended 2006/06/30)

- (c) the CMNPS transition area;
(amended 2006/06/30)
- (d) reduced vertical separation minimum (RVSM) airspace;
(amended 2006/06/30)
- (e) required navigation performance capability (RNP) airspace;
(amended 2006/06/30)
- (f) transponder airspace;
(amended 2006/06/30)
- (g) the air defence identification zone (ADIZ);
(amended 2006/06/30)
- (h) flight information regions (FIR);
(amended 2006/06/30)
- (i) altimeter setting regions;
(amended 2006/06/30)
- (j) standard pressure regions;
(amended 2006/06/30)
- (k) mountainous regions; and
(amended 2006/06/30)
- (l) any other areas, zones, regions and points.
(amended 2006/06/30)

Airspace Classification

601.02 (1) The class of any controlled airspace of a type referred to in subsection 601.01(1) is one of the following, as specified in the *Designated Airspace Handbook*:

- (a) Class A;
- (b) Class B;
- (c) Class C;
- (d) Class D;
- (e) Class E;
- (f) Class F Special Use Restricted; or
- (g) Class F Special Use Advisory.

(2) The class of any uncontrolled airspace of a type referred to in subsection 601.01(2) is one of the following, as specified in the *Designated Airspace Handbook*:

- (a) Class G;
- (b) Class F Special Use Restricted; or
- (c) Class F Special Use Advisory.

Transponder Airspace

601.03 Transponder airspace consists of

- (a) all Class A, B and C airspace as specified in the *Designated Airspace Handbook*; and (amended 2006/06/30)
- (b) any Class D or E airspace specified as transponder airspace in the *Designated Airspace Handbook*.

***IFR or VFR Flight in Class F Special Use
Restricted Airspace or Class F Special Use Advisory
Airspace***

601.04 (1) The procedures for the operation of aircraft in Class F Special Use Restricted airspace and Class F Special Use Advisory airspace are those specified in the *Designated Airspace Handbook*.

(2) No person shall operate an aircraft in Class F Special Use Restricted airspace unless authorized to do so by the person specified for that purpose in the *Designated Airspace Handbook*.

(3) For the purposes of subsection (2), a person specified in the *Designated Airspace Handbook* may authorize the operation of an aircraft where activities on the ground or in the airspace are not hazardous to aircraft operating in that airspace and access by aircraft to that airspace does not jeopardize national security interests.

***IFR Flight in Class A, B, C, D or E Airspace or
Class F Special Use Restricted or Class F Special
Use Advisory Controlled Airspace***

601.05 (1) No person shall operate an IFR aircraft in Class A, B, C, D or E airspace or in Class F Special Use Restricted or Class F Special Use Advisory controlled airspace unless the aircraft is operated in accordance with an air traffic control clearance or an authorization issued by the Minister.

(2) The Minister may issue an authorization referred to in subsection (1) where the operation of the aircraft is in the public interest and is not likely to affect aviation safety.

VFR Flight in Class A Airspace

601.06 (1) No person shall operate a VFR aircraft in Class A airspace unless the aircraft is operated in accordance with an authorization issued by the Minister.

(2) The Minister may issue an authorization referred to in subsection (1) where the operation of the aircraft is in the public interest and is not likely to affect aviation safety.

VFR Flight in Class B Airspace

601.07 (1) No person shall operate a VFR aircraft in Class B airspace unless the aircraft is operated in accordance with an air traffic control clearance or an authorization issued by the Minister.

(2) The Minister may issue an authorization referred to in subsection (1) where the operation of the aircraft is in the public interest and is not likely to affect aviation safety.

(3) The pilot-in-command of a VFR aircraft operating in Class B airspace in accordance with an air traffic control clearance shall, when it becomes evident that it will not be possible to operate the aircraft in VMC at the altitude or along the route specified in the air traffic control clearance,

(a) where the airspace is a control zone, request authorization to operate the aircraft in special VFR flight; and

(b) in any other case,

(i) request an amended air traffic control clearance that will enable the aircraft to be operated in VMC to the destination specified in the flight plan or to an alternate aerodrome, or

(ii) request an air traffic control clearance to operate the aircraft in IFR flight.

VFR Flight in Class C Airspace

601.08 (1) Subject to subsection (2), no person operating a VFR aircraft shall enter Class C airspace unless the person receives a clearance to enter from the appropriate air traffic control unit before entering the airspace.

(2) The pilot-in-command of a VFR aircraft that is not equipped with radiocommunication equipment capable of two-way communication with the appropriate air traffic control unit may, during daylight in VMC, enter Class C airspace if the pilot-in-command receives authorization to enter from the appropriate air traffic control unit before entering the airspace.

(3) Class C airspace becomes Class E airspace when the appropriate air traffic control unit is not in operation.

VFR Flight in Class D Airspace

601.09 (1) Subject to subsection (2), no person operating a VFR aircraft shall enter Class D airspace unless the person establishes two-way radio contact with the appropriate air traffic control unit before entering the airspace.

(2) The pilot-in-command of a VFR aircraft that is not equipped with radiocommunication equipment capable of two-way communication with the appropriate air traffic control unit may, during daylight in VMC, enter Class D airspace if the pilot-in-command receives authorization to enter from the appropriate air traffic control unit before entering the airspace.

(3) Class D airspace becomes Class E airspace when the appropriate air traffic control unit is not in operation.

601.10 to 601.13 Reserved

DIVISION II - AIRCRAFT OPERATING RESTRICTIONS AND HAZARDS TO AVIATION SAFETY

Interpretation

601.14 In this Division,

“directed bright light source” means any directed light source (coherent or non-coherent) including lasers, that may create a hazard to aviation safety or cause damage to an aircraft or injury to persons on board the aircraft; (*source lumineuse dirigée de forte intensité*) (amended 2002/06/01)

“fire control authority” - means an official of a government forestry service or other fire control agency that is responsible for the protection of persons and property against fire; (*responsable de la lutte contre l’incendie*)

“forest fire area” - means an area on the surface of the earth on which standing timber, grass or any other vegetation or buildings are burning. (*région sinistrée*)

Forest Fire Aircraft Operating Restrictions

601.15 No person shall operate an aircraft

(a) over a forest fire area, or over any area that is located within five nautical miles of a forest fire area, at an altitude of less than 3,000 feet AGL; or

(b) in any airspace that is described in a NOTAM issued pursuant to Section 601.16.

Issuance of NOTAM for Forest Fire Aircraft Operating Restrictions

601.16 The Minister may issue a NOTAM that relates to restrictions on the operation of aircraft in the case of a forest fire and that describes

(a) the location and dimensions of the forest fire area; and

(b) the airspace in which forest fire control operations are being conducted.

Exceptions

601.17 Section 601.15 does not apply to

(a) persons who are operating an aircraft at the request of an appropriate fire control authority; and

(b) Department of Transport personnel who are operating an aircraft in the performance of duties related to surveillance and the enforcement of aviation legislation.

Orders Prohibiting or Restricting Aircraft Operation

601.18 The Minister may make orders prohibiting or restricting the operation of aircraft over such areas as are specified by the Minister, either absolutely or subject to such exceptions or conditions as may be specified by the Minister.

601.19 Reserved
(amended 2011/12/31)

Projection of Directed Bright Light Source at an Aircraft

601.20 Subject to section 601.21, no person shall project or cause to be projected a directed bright light source into navigable airspace in such a manner as to create a hazard to aviation safety or cause damage to an aircraft or injury to persons on board the aircraft.
(amended 2002/06/01)

Requirement for Notification

601.21 (1) Any person planning to project or cause to be projected a directed bright light source into navigable airspace with sufficient power to create a hazard to aviation safety shall provide written notification to the Minister before the projection.
(amended 2002/06/01)

(2) On receipt of the notification, the Minister may issue an authorization if the projection of the directed bright light source is not likely to create a hazard to aviation safety.
(amended 2002/06/01)

Requirement for Pilot-in-command

601.22 (1) No pilot-in-command shall intentionally operate an aircraft into a beam from a directed bright light source or into an area where a directed bright light source is projected, unless the aircraft is operated in accordance with an authorization issued by the Minister.
(amended 2002/06/01)

(2) The Minister may issue the authorization if the operation of the aircraft is not likely to create a hazard to aviation safety.
(amended 2002/06/01)

DIVISION III — MARKING AND LIGHTING OF OBSTACLES TO AIR NAVIGATION

Obstacles to Air Navigation

601.23 (1) For the purposes of this Division, any building, structure or object, including any addition to it, constitutes an obstacle to air navigation if
(amended 2011/12/31)

(a) it penetrates an airport obstacle limitation surface as calculated in Chapter 4 of the Standard entitled *Aerodrome Standards and Recommended Practices*, TP 312E, published by the Department of Transport;

(b) it is higher than 90 m AGL and is located within 6 km of the geographical centre of an aerodrome;

(c) it is higher than 90 m AGL and is located within 3.7 km of the centreline of a recognized VFR route, including, but not limited to, a valley, a railway track, a transmission line, a pipeline, a river and a highway;

(d) it is higher than 150 m AGL; or

(e) in the case of any catenary wires crossing over a river, any portion of the wires or supporting structures is higher than 90 m AGL.

(2) For the purposes of subsection (1), an addition to a building, structure or object includes any vertical mast, pole, tower or other object erected on top of the building, structure or object and adding to its height.
(amended 2011/12/31)

Marking and Lighting of Obstacles to Air Navigation

601.24 (1) Any person who plans to construct or modify a building, structure or object, or launch a tethered object shall notify the Minister of the proposed construction, modification or launch in accordance with the requirements of Standard 621 if the building, structure or object, or tethered object, will constitute an obstacle to air navigation.
(amended 2011/12/31)

(2) A person who has responsibility for or control over a building, structure or object that constitutes an obstacle to air navigation shall
(amended 2011/12/31)

(a) mark and light the building, structure or object in accordance with the requirements of Standard 621; or

(b) use the equivalent marking and lighting approved by the Minister under subsection 601.27(2).

Other Obstacles to Air Navigation

601.25 (1) If the Minister determines that a building, structure or object, other than a building, structure or object described in section 601.23, is hazardous to air navigation because of its height or location, the Minister shall require the person who has responsibility for or control over the building, structure or object to mark and light it in accordance with the requirements of Standard 621.

(amended 2011/12/31)

(2) A person who is required by the Minister to mark and light a building, structure or object under subsection (1) shall

(amended 2011/12/31)

(a) do so within six months; and

(b) cause to be received at the appropriate air traffic control unit or flight service station a notice identifying the nature, location and height of the building, structure or object.

Upgrading of Marking and Lighting

601.26 A person who has responsibility for or control over an obstacle to air navigation shall upgrade the markings and lights of the whole obstacle to the most recent requirements set out in Standard 621 if any change occurs in

(amended 2011/12/31)

(a) the location of the obstacle with respect to any other marked or lighted obstacle; or

(b) the surrounding conditions of the obstacle that can affect aviation safety.

Equivalent Marking and Lighting

601.27 (1) A person who proposes to use equivalent marking and lighting on an obstacle to air navigation for which the person has responsibility or over which the person has control shall apply to the Minister for approval.

(amended 2011/12/31)

(2) The Minister shall approve the equivalent marking and lighting if the applicant

(amended 2011/12/31)

(a) submits a risk assessment that identifies the risks to air navigation associated with the obstacle and the methods for eliminating or reducing those risks; and

(b) demonstrates that the equivalent marking and lighting provides a level of safety at least equivalent to the level provided by the requirements of Standard 621.

(3) In determining whether the equivalent marking and lighting provides the level of safety required by paragraph (2)(b), the Minister shall consider the following factors:
(amended 2011/12/31)

- (a) the location of the obstacle;
- (b) the surrounding terrain, buildings, structures and objects;
- (c) the VFR air traffic volume; and
- (d) the proximity of the obstacle to an aerodrome.

***Notification of Deterioration, Failure or
Malfunction***

601.28 A person who has responsibility for or control over an obstacle to air navigation shall report immediately any deterioration of a marking or any failure or malfunction of a light required under this Division to the nearest flight service station.
(amended 2011/12/31)

Prohibition

601.29 No person shall deface, alter or otherwise damage a marking or a light required, under this Division, to be displayed on an obstacle to air navigation.
(amended 2011/12/31)



CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 2 - OPERATING AND FLIGHT RULES

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PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 2 - OPERATING AND FLIGHT RULES

DIVISION I - GENERAL

Reckless or Negligent Operation of Aircraft

602.01 No person shall operate an aircraft in such a reckless or negligent manner as to endanger or be likely to endanger the life or property of any person.

Fitness of Flight Crew Members

602.02 No operator of an aircraft shall require any person to act as a flight crew member and no person shall act as a flight crew member, if either the person or the operator has any reason to believe, having regard to the circumstances of the particular flight to be undertaken, that the person

- (a) is suffering or is likely to suffer from fatigue; or
- (b) is otherwise unfit to perform properly the person's duties as a flight crew member.

Alcohol or Drugs - Crew Members

602.03 No person shall act as a crew member of an aircraft

- (a) within eight hours after consuming an alcoholic beverage;
- (b) while under the influence of alcohol; or
- (c) while using any drug that impairs the person's faculties to the extent that the safety of the aircraft or of persons on board the aircraft is endangered in any way.

Alcohol or Drugs - Passengers

602.04 (1) In this section, "intoxicating liquor" means a beverage that contains more than 2.5 per cent proof spirits.

(2) No person shall consume on board an aircraft an intoxicating liquor unless the intoxicating liquor

- (a) has been served to that person by the operator of the aircraft; or
- (b) where no flight attendant is on board, has been provided by the operator of the aircraft.

(3) No operator of an aircraft shall provide or serve any intoxicating liquor to a person on board the aircraft, where there are reasonable grounds to believe that the person's faculties are impaired by alcohol or a drug to an extent that may present a hazard to the aircraft or to persons on board the aircraft.

(4) Subject to subsection (5), no operator of an aircraft shall allow a person to board the aircraft, where there are reasonable grounds to believe that the person's faculties are impaired by alcohol or a drug to an extent that may present a hazard to the aircraft or to persons on board the aircraft.

(5) The operator of an aircraft may allow a person whose faculties are impaired by a drug to board an aircraft, where the drug was administered in accordance with a medical authorization and the person is under the supervision of an attendant.

Compliance with Instructions

602.05 (1) Every passenger on board an aircraft shall comply with instructions given by any crew member respecting the safety of the aircraft or of persons on board the aircraft.

(2) Every crew member on board an aircraft shall, during flight time, comply with the instructions of the pilot-in-command or of any person whom the pilot-in-command has authorized to act on behalf of the pilot-in-command.

Smoking

602.06 (1) No person shall smoke on board an aircraft during take-off or landing or when directed not to smoke by the pilot-in-command.

(2) No person shall smoke in an aircraft lavatory.

(3) No person shall tamper with or disable a smoke detector installed in an aircraft lavatory without permission from a crew member or the operator of the aircraft.

Aircraft Operating Limitations

602.07 No person shall operate an aircraft unless it is operated in accordance with the operating limitations

(a) set out in the aircraft flight manual, where an aircraft flight manual is required by the applicable standards of airworthiness;

(b) set out in a document other than the aircraft flight manual, where use of that document is authorized pursuant to Part VII;

(c) indicated by markings or placards required pursuant to section 605.05; or

(d) prescribed by the competent authority of the state of registry of the aircraft.

Portable Electronic Devices

602.08 (1) No operator of an aircraft shall permit the use of a portable electronic device on board an aircraft, where the device may impair the functioning of the aircraft's systems or equipment.

(2) No person shall use a portable electronic device on board an aircraft except with the permission of the operator of the aircraft.

Fuelling with Engines Running

602.09 No person operating an aircraft shall permit the fuelling of the aircraft while an engine used for the propulsion of the aircraft is running and passengers are on board the aircraft or are embarking or disembarking, unless subsection 704.33(4) or 705.40(3), as applicable, is complied with.

(amended 2005/11/15)

Starting and Ground Running of Aircraft Engines

602.10 (1) No person shall start an engine of an aircraft unless

- (a) a pilot's seat is occupied by a person who is competent to control the aircraft;
- (b) precautions have been taken to prevent the aircraft from moving; or
- (c) in the case of a seaplane, the aircraft is in a location from which any movement of the aircraft will not endanger persons or property.

(2) No person shall leave an engine of an aircraft running unless

- (a) a pilot's seat is occupied by a person who is competent to control the aircraft; or
- (b) where no persons are on board the aircraft,
 - (i) precautions have been taken to prevent the aircraft from moving, and
 - (ii) the aircraft is not left unattended.

Aircraft Icing

602.11 (1) In this section, "critical surfaces" means the wings, control surfaces, rotors, propellers, horizontal stabilizers, vertical stabilizers or any other stabilizing surface of an aircraft and, in the case of an aircraft that has rear-mounted engines, includes the upper surface of its fuselage.

(2) No person shall conduct or attempt to conduct a take-off in an aircraft that has frost, ice or snow adhering to any of its critical surfaces.

(3) Notwithstanding subsection (2), a person may conduct a take-off in an aircraft that has frost adhering to the underside of its wings that is caused by cold-soaked fuel, if the take-off is conducted in accordance with the aircraft manufacturer's instructions for take-off under those conditions.

(4) Where conditions are such that frost, ice or snow may reasonably be expected to adhere to the aircraft, no person shall conduct or attempt to conduct a take-off in an aircraft unless

- (a) for aircraft that are not operated under Subpart 5 of Part VII,
 - (i) the aircraft has been inspected immediately prior to take-off to determine whether any frost, ice or snow is adhering to any of its critical surfaces, or
 - (ii) the operator has established an aircraft inspection program in accordance with the *Operating and Flight Rules Standards*, and the dispatch and take-off of the aircraft are in accordance with that program; and

(b) for aircraft that are operated under Subpart 5 of Part VII, the operator has established an aircraft inspection program in accordance with the *Operating and Flight Rules Standards*, and the dispatch and take-off of the aircraft are in accordance with that program.

(5) The inspection referred to in subparagraph (4)(a)(i) shall be performed by

(a) the pilot-in-command;

(b) a flight crew member of the aircraft who is designated by the pilot-in-command; or

(c) a person, other than a person referred to in paragraph (a) or (b), who

(i) is designated by the operator of the aircraft, and

(ii) has successfully completed an aircraft surface contamination training program pursuant to Subpart 4 or Part VII.

(6) Where, before commencing take-off, a crew member of an aircraft observes that there is frost, ice or snow adhering to the wings of the aircraft, the crew member shall immediately report that observation to the pilot-in-command, and the pilot-in-command or a flight crew member designated by the pilot-in-command shall inspect the wings of the aircraft before take-off.

(7) Before an aircraft is de-iced or anti-iced, the pilot-in-command of the aircraft shall ensure that the crew members and passengers are informed of the decision to do so.

***Overflight of Built-up Areas or Open-air Assemblies of
Persons during Take-offs, Approaches and Landings***

602.12 (1) For the purposes of this section and sections 602.14 and 602.15, an aircraft shall be deemed to be operated over a built-up area or over an open-air assembly of persons if the built-up area or open-air assembly of persons is within a horizontal distance of
(amended 2003/03/01)

(a) 500 feet from a helicopter or balloon; or

(amended 2003/03/01)

(b) 2,000 feet from an aircraft other than a helicopter or balloon.

(amended 2003/03/01)

(2) Except at an airport, heliport or military aerodrome, no person shall conduct a take-off, approach or landing in an aircraft over a built-up area or over an open-air assembly of persons, in a manner that is likely to create a hazard to persons or property.

(amended 2007/06/30)

(3) Except at an airport, heliport or military aerodrome, no person shall conduct a take-off, approach or landing in an aircraft over a built-up area or over an open-air assembly of persons unless that aircraft will be operated at an altitude from which, in the event of an engine failure or any other emergency necessitating an immediate landing, the aircraft can land without creating a hazard to persons or property.

(amended 2007/06/30)

*Take-offs, Approaches and Landings within
Built-up Areas of Cities and Towns*

602.13 (1) Except if otherwise permitted under this section, section 603.66 or Part VII, no person shall conduct a take-off, approach or landing in an aircraft within a built-up area of a city or town, unless that take-off, approach or landing is conducted at an airport, heliport or a military aerodrome.

(amended 2007/06/30)

(2) A person may conduct a take-off or landing in an aircraft within a built-up area of a city or town at a place that is not located at an airport, heliport or a military aerodrome where
(amended 2007/06/30)

- (a) the place is not set apart for the operation of aircraft;
- (b) the flight is conducted without creating a hazard to persons or property on the surface; and
- (c) the aircraft is operated
 - (i) for the purpose of a police operation that is conducted in the service of a police authority, or
 - (ii) for the purpose of saving human life.

(3) A person may conduct a take-off in a balloon within a built-up area of a city or town from a place that is not located at an airport, heliport or a military aerodrome, where
(amended 2007/06/30)

- (a) permission to use the place as a launch site has been obtained from the land owner;
- (b) a special aviation event is not being held at that place at the time of take-off;
- (c) no written objection in respect of the use of the place as a launch site has been received by the Minister from a competent land use authority;
- (d) the diameter of the launch site is no less than the greater of
 - (i) 100 feet, and
 - (ii) the greatest dimension of the balloon, be it the length, width or height, plus 25 per cent; and
- (e) the take-off point within the launch site is upwind of the highest obstacle in the take-off path by a horizontal distance equal to the height of that obstacle, and the take-off is conducted
 - (i) using a positive rate of climb to a minimum altitude of 500 feet above the highest obstacle located within a horizontal distance of 500 feet from the balloon, or
 - (ii) where the flight path of the balloon is directly over residential or commercial buildings or over an open-air assembly of persons, using the maximum rate of climb possible, considering operational and passenger safety.

(4) A person may conduct a landing in a balloon within a built-up area of a city or town at a place that is not located at an airport, heliport or military aerodrome, where
(amended 2011/01/21)

- (a) the landing is necessary to avoid endangering the safety of the persons on board; and
- (b) the pilot-in-command contacts the appropriate air traffic control unit or flight service station, either prior to landing or as soon as possible after landing, and provides
 - (i) the balloon's nationality mark and registration mark,
 - (ii) the estimated or actual, as applicable, time and location of the landing, and
 - (iii) the reasons why it is believed that the safety of the persons on board is or was endangered.

Minimum Altitudes and Distances

602.14 (1)

[Repealed 2003/03/01]

(2) Except where conducting a take-off, approach or landing or where permitted under section 602.15, no person shall operate an aircraft

- (a) over a built-up area or over an open-air assembly of persons unless the aircraft is operated at an altitude from which, in the event of an emergency necessitating an immediate landing, it would be possible to land the aircraft without creating a hazard to persons or property on the surface, and, in any case, at an altitude that is not lower than
 - (i) for aeroplanes, 1,000 feet above the highest obstacle located within a horizontal distance of 2,000 feet from the aeroplane,
 - (ii) for balloons, 500 feet above the highest obstacle located within a horizontal distance of 500 feet from the balloon, or
 - (iii) for an aircraft other than an aeroplane or a balloon, 1,000 feet above the highest obstacle located within a horizontal distance of 500 feet from the aircraft; and
- (b) in circumstances other than those referred to in paragraph (a), at a distance less than 500 feet from any person, vessel, vehicle or structure.

Permissible Low Altitude Flight

602.15 (1) A person may operate an aircraft at altitudes and distances less than those specified in subsection 602.14(2) where the aircraft is operated at altitudes and distances that are no less than necessary for the purposes of the operation in which the aircraft is engaged, the aircraft is operated without creating a hazard to persons or property on the surface and the aircraft is operated

- (a) for the purpose of a police operation that is conducted in the service of a police authority;
- (b) for the purpose of saving human life;
- (c) for fire-fighting or air ambulance operations;

(d) for the purpose of the administration of the *Fisheries Act* or the *Coastal Fisheries Protection Act*;

(e) for the purpose of the administration of the national or provincial parks; or

(f) for the purpose of flight inspection.

(2) A person may operate an aircraft, to the extent necessary for the purpose of the operation in which the aircraft is engaged, at altitudes and distances less than those set out in

(a) paragraph 602.14(2)(a), where operation of the aircraft is authorized under Subpart 3 or section 702.22; or

(b) paragraph 602.14(2)(b), where the aircraft is operated without creating a hazard to persons or property on the surface and the aircraft is operated for the purpose of

(i) aerial application or aerial inspection,

(ii) aerial photography conducted by the holder of an air operator certificate,

(iii) helicopter external load operations, or

(iv) flight training conducted by or under the supervision of a qualified flight instructor.

***Flights over Open-air Assemblies of Persons or Built-up
Areas - Helicopters with External Loads***

602.16 (1) No person shall operate a helicopter that is carrying a Class B, C or D external load over an open-air assembly of persons.

(2) Except where authorized under section 603.66 or 702.22, no person shall operate a helicopter that is carrying a Class B, C or D external load over a built-up area.

Carriage of Persons during Low Altitude Flight

602.17 No person operating an aircraft shall conduct helicopter Class B, C or D external load operations or engage in aerial application or aerial inspection at altitudes less than 500 feet AGL while carrying on board any person other than a flight crew member, unless that person's presence on board is essential to the purposes of the flight.

Flights over Built-up Areas - Balloons

602.18 (1) No person shall operate a balloon over a built-up area without carrying on board sufficient fuel to permit the balloon to fly clear of the built-up area, taking into consideration the take-off weight of the balloon, the ambient temperature and actual and forecast winds, and possible variations of those factors.

(2) No person shall operate a balloon on a flight that is planned to enter Class C airspace while over a built-up area unless the clearance to enter that airspace that is required pursuant to section 601.08 has been obtained from the appropriate air traffic control unit prior to take-off.

Right of Way - General

602.19 (1) Notwithstanding any other provision of this section,

(a) the pilot-in-command of an aircraft that has the right of way shall, if there is any risk of collision, take such action as is necessary to avoid collision; and

(b) where the pilot-in-command of an aircraft is aware that another aircraft is in an emergency situation, the pilot-in-command shall give way to that other aircraft.

(2) When two aircraft are converging at approximately the same altitude, the pilot-in-command of the aircraft that has the other on its right shall give way, except as follows:

(a) a power-driven, heavier-than-air aircraft shall give way to airships, gliders and balloons;

(b) an airship shall give way to gliders and balloons;

(c) a glider shall give way to balloons; and

(d) a power-driven aircraft shall give way to aircraft that are seen to be towing gliders or other objects or carrying a slung load.

(3) When two balloons operating at different altitudes are converging, the pilot-in-command of the balloon at the higher altitude shall give way to the balloon at the lower altitude.

(4) Where an aircraft is required to give way to another aircraft, the pilot-in-command of the first-mentioned aircraft shall not pass over or under, or cross ahead of, the other aircraft unless passing or crossing at such a distance as will not create a risk of collision.

(5) Where two aircraft are approaching head-on or approximately so and there is a risk of collision, the pilot-in-command of each aircraft shall alter its heading to the right.

(6) An aircraft that is being overtaken has the right of way and the pilot-in-command of the overtaking aircraft, whether climbing, descending or in level flight, shall give way to the other aircraft by altering the heading of the overtaking aircraft to the right, and no subsequent change in the relative positions of the two aircraft shall absolve the pilot-in-command of the overtaking aircraft from this obligation until that aircraft has entirely passed and is clear of the other aircraft.

(7) Where an aircraft is in flight or manoeuvring on the surface, the pilot-in-command of the aircraft shall give way to an aircraft that is landing or about to land.

(8) The pilot-in-command of an aircraft that is approaching an aerodrome for the purpose of landing shall give way to any aircraft at a lower altitude that is also approaching the aerodrome for the purpose of landing.

(9) The pilot-in-command of an aircraft at a lower altitude, as described in subsection (8), shall not overtake or cut in front of an aircraft at a higher altitude that is in the final stages of an approach to land.

(10) No person shall conduct or attempt to conduct a take-off or landing in an aircraft until there is no apparent risk of collision with any aircraft, person, vessel, vehicle or structure in the take-off or landing path.

Right of Way - Aircraft Manoeuvring on Water

602.20 (1) Where an aircraft on the water has another aircraft or a vessel on its right, the pilot-in-command of the first-mentioned aircraft shall give way.

(2) Where an aircraft on the water is approaching another aircraft or a vessel head-on, or approximately so, the pilot-in-command of the first-mentioned aircraft shall alter its heading to the right.

(3) The pilot-in-command of an aircraft that is overtaking another aircraft or a vessel on the water shall alter its heading to keep well clear of the other aircraft or the vessel.

Avoidance of Collision

602.21 No person shall operate an aircraft in such proximity to another aircraft as to create a risk of collision.

Towing

602.22 No person shall operate an aeroplane that is towing an object unless the aeroplane is equipped with a tow hook and release control mechanism.
(amended 2006/06/30)

Dropping of Objects

602.23 No person shall create a hazard to persons or property on the surface by dropping an object from an aircraft in flight.

Formation Flight

602.24 No person shall operate an aircraft in formation with other aircraft except by pre-arrangement between

- (a) the pilots-in-command of the aircraft; or
- (b) where the flight is conducted within a control zone, the pilots-in-command and the appropriate air traffic control unit.

Entering or Leaving an Aircraft in Flight

602.25 (1) No person shall enter or leave an aircraft in flight except with the permission of the pilot-in-command of the aircraft.

(2) No pilot-in-command of an aircraft shall permit a person to enter or leave the aircraft during flight unless

- (a) the person leaves for the purpose of making a parachute descent;
(amended 2006/06/30)
- (b) the entering or leaving is permitted under section 702.19; or
(amended 2006/06/30)
- (c) the flight is conducted in accordance with
(amended 2006/06/30)

- (i) a special flight operations certificate — special aviation event issued under section 603.02, or
(amended 2006/06/30)
- (ii) a special flight operations certificate issued under section 603.67.
(amended 2006/06/30)

Parachute Descents

602.26 Except where permitted in accordance with section 603.37, no pilot-in-command of an aircraft shall permit, and no person shall conduct, a parachute descent from the aircraft

- (a) in or into controlled airspace or an air route; or
- (b) over or into a built-up area or an open-air assembly of persons.

Aerobatic Manoeuvres - Prohibited Areas and Flight Conditions

602.27 No person operating an aircraft shall conduct aerobatic manoeuvres

- (a) over a built-up area or an open-air assembly of persons;
- (b) in controlled airspace, except in accordance with a special flight operations certificate issued pursuant to section 603.67;
- (c) when flight visibility is less than three miles; or
- (d) below 2,000 feet AGL, except in accordance with a special flight operations certificate issued pursuant to section 603.02 or 603.67.

Aerobatic Manoeuvres with Passengers

602.28 No person operating an aircraft with a passenger on board shall conduct an aerobatic manoeuvre unless the pilot-in-command of the aircraft has engaged in

- (a) at least 10 hours dual flight instruction in the conducting of aerobatic manoeuvres or 20 hours conducting aerobatic manoeuvres; and
- (b) at least one hour of conducting aerobatic manoeuvres in the preceding six months.

Hang Glider and Ultra-light Aeroplane Operation

602.29 (1) No person shall operate a hang glider or an ultra-light aeroplane

- (a) at night;
- (b) in IFR flight;
- (c) subject to subsections (2) and (3), in controlled airspace;
- (d) unless the aircraft is equipped with
 - (i) a suitable means of restraint that is attached to the primary structure of the aircraft,

- (ii) a radiocommunication system adequate to permit two-way communication on the appropriate frequency when the aircraft is operated within
 - (A) Class D airspace,
 - (B) the ADIZ, or
 - (C) an MF area, and
- (iii) where the aircraft is an ultra-light aeroplane, a placard that is affixed to a surface in plain view of any occupant seated at the flight controls and that states, "THIS AEROPLANE IS OPERATING WITHOUT A CERTIFICATE OF AIRWORTHINESS/CET AVION EST UTILISÉ SANS CERTIFICAT DE NAVIGABILITÉ";
- (e) subject to subsections (4) and (5), while carrying another person on board; or
- (f) unless each person on board
 - (i) is secured by a means of restraint referred to in subparagraph (d)(i), and
 - (ii) where the aircraft is not an advanced ultra-light aeroplane, is wearing a protective helmet.
- (2) A person may operate a hang glider or an ultra-light aeroplane in controlled airspace
 - (a) within five nautical miles from the centre of an airport or heliport or within a control zone of an uncontrolled airport where the person has obtained permission from the airport or heliport operator;
(amended 2007/06/30)
 - (b) within a control zone of a controlled airport where the person has obtained an air traffic control clearance by two-way radio voice communication from the air traffic control unit of the airport; or
 - (c) where the aircraft is an advanced ultra-light aeroplane, if the aeroplane is equipped in accordance with section 605.14.
- (3) A person may operate a hang glider in Class E airspace where
 - (a) the pilot
 - (i) is at least 16 years of age,
 - (ii) is in possession of a Category 1, 3 or 4 medical certificate, and
 - (iii) has obtained a grade of not less than 60 per cent on a Department of Transport written examination pertaining to the *Canadian Aviation Regulations*, air traffic procedures, flight instruments, navigation, flight operations and human factors respecting hang glider operations in Class E airspace;
 - (b) the hang glider is equipped with a magnetic compass and altimeter;
 - (c) the flight is a cross-country flight; and

(d) the pilot informs the nearest flight service station of the time of departure and estimated duration of the flight in Class E airspace.

(4) A person may operate

(a) a hang glider with one other person on board if the flight is conducted for the purpose of providing dual flight instruction; or
(amended 2005/12/01)

(b) an ultra-light aeroplane with one other person on board if
(amended 2005/12/01)

- (i) the flight is conducted for the purpose of providing dual flight instruction,
- (ii) the pilot is a holder of a pilot permit — ultra-light aeroplane endorsed with a passenger-carrying rating and the aeroplane has no restrictions against carrying another person, or
- (iii) the other person is a holder of a pilot licence or permit, other than a student pilot permit, that allows them to act as pilot-in-command of an ultra-light aeroplane.

(5) A person may operate an advanced ultra-light aeroplane with another person on board where the pilot holds a permit or licence issued pursuant to Subpart 1 of Part IV that is appropriate to the functions or privileges being exercised.

Fuel Dumping

602.30 No person shall jettison fuel from an aircraft in flight unless

- (a) it is necessary to do so in order to ensure aviation safety; and
- (b) all appropriate measures are taken to minimize danger to human life and damage to the environment, insofar as the circumstances permit.

Compliance with Air Traffic Control Instructions and Clearances

602.31 (1) Subject to subsection (3), the pilot-in command of an aircraft shall

- (a) comply with and acknowledge, to the appropriate air traffic control unit, all of the air traffic control instructions directed to and received by the pilot-in-command; and
- (b) comply with all of the air traffic control clearances received and accepted by the pilot-in-command and
 - (i) subject to subsection (2), in the case of an IFR flight, read back to the appropriate air traffic control unit the text of any air traffic control clearance received, and
 - (ii) in the case of a VFR flight, read back to the appropriate air traffic control unit the text of any air traffic control clearance received, when so requested by the air traffic control unit.

(2) Except if requested to do so by an air traffic control unit, the pilot-in-command of an IFR aircraft is not required to read back the text of an air traffic control clearance pursuant to paragraph (1)(b)(i) where

(a) the air traffic control clearance is received on the ground by the pilot-in-command before departing from a controlled aerodrome in respect of which a standard instrument departure procedure is specified in the *Canada Air Pilot*; or

(b) the receipt of the air traffic control clearance is acknowledged by the pilot-in-command by electronic means.

(3) The pilot-in-command of an aircraft may deviate from an air traffic control clearance or an air traffic control instruction to the extent necessary to carry out a collision avoidance manoeuvre, where the manoeuvre is carried out

(a) in accordance with a resolution advisory generated by an Airborne Collision Avoidance System (ACAS) or a Traffic Alert and Collision Avoidance System (TCAS); or

(b) in response to a warning from a Ground Proximity Warning System (GPWS) on board the aircraft.

(4) The pilot-in-command of an aircraft shall

(a) as soon as possible after initiating the collision avoidance manoeuvre referred to in subsection (3), inform the appropriate air traffic control unit of the deviation; and

(b) immediately after completing the collision avoidance manoeuvre referred to in subsection (3), comply with the last air traffic control clearance received and accepted by, or the last air traffic control instruction received and acknowledged by, the pilot-in-command.

Airspeed Limitations

602.32 (1) Subject to subsection (2), no person shall
(amended 2010/11/10)

(a) operate an aircraft at an indicated airspeed of more than 250 knots if the aircraft is below 10,000 feet ASL; or

(amended 2010/11/10)

(b) operate an aircraft at an indicated airspeed of more than 200 knots if the aircraft is below 3,000 feet AGL within 10 nautical miles of a controlled aerodrome unless authorized to do so in an air traffic control clearance.

(amended 2010/11/10)

(2) A person may operate an aircraft at an indicated airspeed greater than the airspeeds referred to in subsection (1) if the aircraft is being operated in accordance with a special flight operations certificate - special aviation event issued pursuant to section 603.02.
(amended 2010/11/10)

(3) If the minimum safe airspeed for the flight configuration of an aircraft is greater than the airspeed referred to in subsection (1), the aircraft shall be operated at the minimum safe airspeed.

(amended 2010/11/10)

Supersonic Flight

602.33 No person shall operate an aircraft at a true Mach number of 1 or greater.

Cruising Altitudes and Cruising Flight Levels

602.34 (1) The appropriate cruising altitude or cruising flight level for an aircraft in level cruising flight is determined in accordance with

- (a) the magnetic track, in the Southern Domestic Airspace; and
- (b) the true track, in the Northern Domestic Airspace.

(2) Subject to subsection (3), the pilot-in-command of an aircraft shall ensure that the aircraft is operated at a cruising altitude or cruising flight level appropriate to the track, as set out in the table to this section, unless the pilot-in-command is assigned another altitude or flight level by an air traffic control unit and the aircraft is operated in level cruising flight

- (a) at more than 3,000 feet AGL, in VFR flight; or
- (b) in IFR flight.

(3) Subsection (2) does not apply where an aircraft is operated for the purpose of aerial survey or mapping and the following conditions are met:

- (a) the pilot-in-command of the aircraft contacts the appropriate air traffic control unit as far in advance as possible of the proposed flight;
- (b) the pilot-in-command of the aircraft provides, as far in advance as possible of the proposed take-off time of the aircraft, to any air traffic control unit that so requests, a topographical map at either a 1:500 000 or a 1:1 000 000 scale of the area to be surveyed or mapped, with proposed tracks and planned entry and exit points clearly delineated on the map;
- (c) the pilot-in-command of the aircraft files a flight plan or flight itinerary with an air traffic control unit as far in advance as possible of the proposed take-off time of the aircraft;
- (d) the flight plan or flight itinerary referred to in paragraph (c) specifies the area to be surveyed or mapped
 - (i) by reference to the relevant maps of the National Topographic System,
 - (ii) by reference to the geographic co-ordinates of the area, or
 - (iii) where required by an air traffic control unit, by reference to the air photograph block reference grid map provided by the air traffic control unit; and
- (e) where the aircraft is operated in controlled airspace, it is operated in accordance with an air traffic control clearance.

Table
Cruising Altitudes and Cruising Flight Levels
Appropriate to Aircraft Track

TRACK 000° - 179°			TRACK 180° - 359°	
Column I	Column II		Column III	Column IV
IFR	VFR		IFR	VFR
1,000	-	Cruising Altitudes or Cruising Flight Levels - 18,000 feet and below	2,000	-
3,000	3,500		4,000	4,500
5,000	5,500		6,000	6,500
7,000	7,500		8,000	8,500
9,000	9,500		10,000	10,500
11,000	11,500		12,000	12,500
13,000	13,500		14,000	14,500
15,000	15,500		16,000	16,500
17,000	17,500			
All Flights		Cruising Flight Levels - 180 to 590	All Flights	
190			180	
210			200	
230			220	
250			240	
270			260	
290			280	
330			310	
370			350	
410			390	
450			430	
490			470	
530			510	
570			550	
			590	

***Altimeter-setting and Operating Procedures in the
Altimeter-setting Region***

602.35 When an aircraft is operated in the altimeter-setting region, each flight crew member who occupies a flight crew member position that is equipped with an altimeter shall

- (a) immediately before conducting a take-off from an aerodrome, set the altimeter to the altimeter setting of the aerodrome or, if that altimeter setting is not obtainable, to the elevation of the aerodrome;
- (b) while in flight, set the altimeter to the altimeter setting of the nearest station along the route of flight or, where the nearest stations along the route of flight are separated by more than 150 nautical miles, to the altimeter setting of a station near the route of flight; and

(c) immediately before commencing a descent for the purpose of landing at an aerodrome, set the altimeter to the altimeter setting of the aerodrome, if that altimeter setting is obtainable.

***Altimeter-setting and Operating Procedures in the
Standard Pressure Region***

602.36 (1) When an aircraft is operated in the standard pressure region, each flight crew member who occupies a flight crew member position that is equipped with an altimeter shall

(a) immediately before conducting a take-off from an aerodrome, set the altimeter to the altimeter setting of the aerodrome or, if that altimeter setting is not obtainable, to the elevation of the aerodrome;

(b) before reaching the flight level at which the flight is to be conducted, set the altimeter to 29.92 inches of mercury or 1,013.2 millibars; and

(c) immediately before commencing a descent for the purpose of landing at an aerodrome, set the altimeter to the altimeter setting of the aerodrome, if that altimeter setting is obtainable.

(2) Notwithstanding paragraph (1)(c), when a holding procedure is being conducted before landing at an aerodrome located in the standard pressure region, each flight crew member who occupies a flight crew member position that is equipped with an altimeter shall set the altimeter to the altimeter setting of the aerodrome immediately before descending below the lowest flight level at which the holding procedure is conducted.

***Altimeter-setting and Operating Procedures in
Transition between Regions***

602.37 Except where otherwise authorized by an air traffic control unit, each flight crew member who occupies a flight crew member position that is equipped with an altimeter shall

(a) when flying from the altimeter-setting region into the standard pressure region, set the altimeter to 29.92 inches of mercury or 1,013.2 millibars immediately after the aircraft's entry into the standard pressure region; and

(b) when flying from the standard pressure region into the altimeter-setting region, set the altimeter to the altimeter setting of the nearest station along the route of flight or, where the nearest stations along the route of flight are separated by more than 150 nautical miles, the altimeter setting of a station near the route of flight immediately before the aircraft's entry into the altimeter-setting region.

Flight over the High Seas

602.38 The pilot-in-command of a Canadian aircraft that is in flight over the high seas shall comply with the applicable Rules of the Air set out in Annex 2 to the Convention and the applicable Regional Supplementary Procedures set out in Document 7030/4 of the International Civil Aviation Organization (ICAO).

Transoceanic Flight

602.39 No pilot-in-command of a single-engined aircraft, or of a multi-engined aircraft that would be unable to maintain flight in the event of the failure of any engine, shall commence a flight that will leave Canadian Domestic Airspace and enter airspace over the high seas unless

- (a) the pilot-in-command holds a pilot licence endorsed with an instrument rating;
- (b) the aircraft is equipped with
 - (i) the equipment referred to in section 605.18,
 - (ii) a high frequency radio capable of transmitting and receiving on a minimum of two appropriate international air-ground general purpose frequencies, and
 - (iii) hypothermia protection for each person on board; and
- (c) the aircraft carries sufficient fuel to meet the requirements of section 602.88 and, in addition, carries contingency fuel equal to at least 10 per cent of the fuel required pursuant to section 602.88 to complete the flight to the aerodrome of destination.

Landing at or Take-off from an Aerodrome at Night

602.40 (1) Subject to subsection (2), no person shall conduct a landing or a take-off in a heavier-than-air aircraft at night at an aerodrome unless the aerodrome is lighted in accordance with the aerodrome lighting requirements specified in Part III.

(2) A person may conduct a landing or a take-off in a heavier-than-air aircraft at night at an aerodrome that is not lighted in accordance with the requirements referred to in subsection (1) where

- (a) the flight is conducted without creating a hazard to persons or property on the surface; and
- (b) the aircraft is operated
 - (i) for the purpose of a police operation that is conducted in the service of a police authority, or
 - (ii) for the purpose of saving human life.

Unmanned Air Vehicles (amended 2003/12/01)

602.41 No person shall operate an unmanned air vehicle in flight except in accordance with a special flight operations certificate or an air operator certificate.
(amended 2003/12/01)

Large Unoccupied Free Balloons

602.42 No person shall release an unoccupied free balloon having a gas-carrying capacity of more than 115 cubic feet (3.256 m³) except in accordance with an authorization issued by the Minister pursuant to section 602.44.

Rockets

602.43 No person shall launch a rocket, other than a model rocket or a rocket of a type used in a fireworks display, except in accordance with an authorization issued by the Minister pursuant to section 602.44.

Authorization by the Minister

602.44 The Minister may issue an authorization referred to in section 602.42 or 602.43 where the release of the balloon or the launch of the rocket is in the public interest and is not likely to affect aviation safety.

Model Aircraft, Kites and Model Rockets

602.45 No person shall fly a model aircraft or a kite or launch a model rocket or a rocket of a type used in a fireworks display into cloud or in a manner that is or is likely to be hazardous to aviation safety.

Refusal to Transport

(amended 2009/06/10)

602.46 No air operator or private operator shall transport a person if at the time of check-in or at boarding the actions or statements of the person indicate that the person may present a risk to the safety of the aircraft, persons or property.
(amended 2009/06/10)

602.47 to 602.56 Reserved
(amended 2009/06/10)

DIVISION II - OPERATIONAL AND EMERGENCY EQUIPMENT REQUIREMENTS

Application

602.57 This Division applies to persons operating

(a) Canadian aircraft; and

(b) foreign aircraft in Canada where those persons are Canadian citizens, permanent residents or corporations incorporated by or under the laws of Canada or a province.

Prohibition

602.58 No person shall operate an aircraft referred to in section 602.57 unless the operational and emergency equipment required by these Regulations is carried on board.

Equipment Standards

602.59 (1) Subject to subsection (2), no person shall operate an aircraft unless the operational and emergency equipment carried on board the aircraft

(a) meets the applicable standards specified in the *Airworthiness Manual*; and

(b) is functional.

(2) Paragraph (1)(a) does not apply in respect of the following operational and emergency equipment:

- (a) survival equipment;
- (b) a personal flotation device;
- (c) a hand-held fire extinguisher, except if carried on board an aircraft operated under Subpart 4 or Part VII, where the extinguisher meets the applicable standards published by the Canadian Standards Association;
- (d) a first aid kit, except if carried on board an aircraft operated under Subpart 4 or Part VII;
- (e) aeronautical charts and publications;
- (f) a timepiece; and
- (g) a flashlight.

Requirements for Power-driven Aircraft

602.60 (1) No person shall conduct a take-off in a power-driven aircraft, other than an ultra-light aeroplane, unless the following operational and emergency equipment is carried on board:

- (a) a checklist or placards that enable the aircraft to be operated in accordance with the limitations specified in the aircraft flight manual, aircraft operating manual, pilot operating handbook or any equivalent document provided by the manufacturer;
- (b) all of the necessary current aeronautical charts and publications covering the route of the proposed flight and any probable diversionary route, if the aircraft is operated in VFR OTT, night VFR flight or IFR flight;
(amended 2006/06/30)
- (c) a current database, if the aircraft is operated in IFR flight, in VFR OTT flight or in night VFR flight under Subpart 4 of Part VI or Subpart 2, 3, 4 or 5 of Part VII and database-dependent navigation equipment is used;
(amended 2006/06/30)
- (d) current data covering the route of the proposed flight and any probable diversionary route, if the aircraft is operated in VFR OTT flight other than VFR OTT flight referred to in paragraph (c) and database-dependent navigation equipment is used;
(amended 2006/06/30)
- (e) a hand-held fire extinguisher in the cockpit that
(amended 2006/06/30)
 - (i) is of a type suitable for extinguishing fires that are likely to occur,
(amended 2006/06/30)
 - (ii) is designed to minimize the hazard of toxic gas concentrations, and
(amended 2006/06/30)

(iii) is readily available to each flight crew member;
(amended 2006/06/30)

(f) a timepiece that is readily available to each flight crew member;

(g) a flashlight that is readily available to each crew member, if the aircraft is operated at night; and
(amended 2006/06/30)

(h) a first aid kit.
(amended 2006/06/30)

(2) A checklist or placards referred to in paragraph (1)(a) shall enable the aircraft to be operated in normal, abnormal and emergency conditions and shall include

- (a) a pre-start check;
- (b) a pre-take-off check;
- (c) a post-take-off check;
- (d) a pre-landing check; and
- (e) emergency procedures.

(3) Emergency procedures referred to in paragraph (2)(e) shall include

- (a) emergency operation of fuel, hydraulic, electrical and mechanical systems, where applicable;
- (b) emergency operation of instruments and controls, where applicable;
- (c) engine inoperative procedures; and
- (d) any other procedure that is necessary for aviation safety.

(4) Checks and emergency procedures referred to in subsections (2) and (3) shall be performed and followed where they are applicable.

Survival Equipment - Flights over Land

602.61 (1) Subject to subsection (2), no person shall operate an aircraft over land unless there is carried on board survival equipment, sufficient for the survival on the ground of each person on board, given the geographical area, the season of the year and anticipated seasonal climatic variations, that provides the means for

- (a) starting a fire;
- (b) providing shelter;
- (c) providing or purifying water; and
- (d) visually signalling distress.

(2) Subsection (1) does not apply in respect of

- (a) a balloon, a glider, a hang glider, a gyroplane or an ultra-light aeroplane;
- (b) an aircraft that is operated within 25 nautical miles of the aerodrome of departure and that has the capability of radiocommunication with a surface-based radio station for the duration of the flight;
- (c) a multi-engined aircraft that is operated south of 66° 30' north latitude
 - (i) in IFR flight within controlled airspace, or
 - (ii) along designated air routes;
- (d) an aircraft that is operated by an air operator, where the aircraft is equipped with equipment specified in the air operator's company operations manual, but not with the equipment required by subsection (1); or
- (e) an aircraft that is operated in a geographical area where and at a time of year when the survival of the persons on board is not jeopardized.

Life Preservers and Flotation Devices

602.62 (1) No person shall conduct a take-off or a landing on water in an aircraft or operate an aircraft over water beyond a point where the aircraft could reach shore in the event of an engine failure, unless a life preserver, individual flotation device or personal flotation device is carried for each person on board.

(2) No person shall operate a land aeroplane, gyroplane, helicopter or airship at more than 50 nautical miles from shore unless a life preserver is carried for each person on board.

(3) No person shall operate a balloon at more than two nautical miles from shore unless a life preserver, individual flotation device or personal flotation device is carried for each person on board.

(4) For aircraft other than balloons, every life preserver, individual flotation device and personal flotation device referred to in this section shall be stowed in a position that is easily accessible to the person for whose use it is provided, when that person is seated.

Life Rafts and Survival Equipment - Flights over Water

602.63 (1) No person shall operate over water a single-engined aeroplane, or a multi-engined aeroplane that is unable to maintain flight with any engine failed, at more than 100 nautical miles, or the distance that can be covered in 30 minutes of flight at the cruising speed filed in the flight plan or flight itinerary, whichever distance is the lesser, from a suitable emergency landing site unless life rafts are carried on board and are sufficient in total rated capacity to accommodate all of the persons on board.

(2) Subject to subsection (3), no person shall operate over water a multi-engined aeroplane that is able to maintain flight with any engine failed at more than 200 nautical miles, or the distance that can be covered in 60 minutes of flight at the cruising speed filed in the flight plan or flight itinerary, whichever distance is the lesser, from a suitable emergency landing site

unless life rafts are carried on board and are sufficient in total rated capacity to accommodate all of the persons on board.

(3) A person may operate over water a transport category aircraft that is an aeroplane, at up to 400 nautical miles, or the distance that can be covered in 120 minutes of flight at the cruising speed filed in the flight plan or flight itinerary, whichever distance is the lesser, from a suitable emergency landing site without the life rafts referred to in subsection (2) being carried on board.

(4) No person shall operate over water a single-engined helicopter, or a multi-engined helicopter that is unable to maintain flight with any engine failed, at more than 25 nautical miles, or the distance that can be covered in 15 minutes of flight at the cruising speed filed in the flight plan or flight itinerary, whichever distance is the lesser, from a suitable emergency landing site unless life rafts are carried on board and are sufficient in total rated capacity to accommodate all of the persons on board.

(5) No person shall operate over water a multi-engined helicopter that is able to maintain flight with any engine failed at more than 50 nautical miles, or the distance that can be covered in 30 minutes of flight at the cruising speed filed in the flight plan or flight itinerary, whichever distance is the lesser, from a suitable emergency landing site unless life rafts are carried on board and are sufficient in total rated capacity to accommodate all of the persons on board.

(6) The life rafts referred to in this section shall be

(a) stowed so that they are easily accessible for use in the event of a ditching;

(b) installed in conspicuously marked locations near an exit; and

(c) equipped with an attached survival kit, sufficient for the survival on water of each person on board the aircraft, given the geographical area, the season of the year and anticipated seasonal climatic variations, that provides a means for

(i) providing shelter,

(ii) providing or purifying water, and

(iii) visually signalling distress.

(7) Where a helicopter is required to carry life rafts pursuant to subsection (4) or (5), no person shall operate the helicopter over water having a temperature of less than 10°C unless

(a) a helicopter passenger transportation suit system is provided for the use of each person on board; and

(b) the pilot-in-command directs each person on board to wear the helicopter passenger transportation suit system.

(8) Every person who has been directed to wear a helicopter passenger transportation suit system pursuant to paragraph (7)(b) shall wear that suit system.

602.64 to 602.69 Reserved

DIVISION III - FLIGHT PREPARATION, FLIGHT PLANS AND FLIGHT ITINERARIES

Interpretation

602.70 In this Division,

"overdue", in respect of an aircraft, means an aircraft for which an arrival report has not been filed

(a) where a flight plan has been filed in respect of the aircraft,

(i) if a search and rescue notification time is specified in the flight plan, immediately after the last reported such time, or

(ii) in all other cases, within one hour after the last reported estimated time of arrival, or

(b) where a flight itinerary has been filed in respect of the aircraft,

(i) if a search and rescue notification time is specified in the flight itinerary, immediately after the last reported such time, or

(ii) in all other cases, within 24 hours after the last reported estimated time of arrival; (*en retard*)

"responsible person" means an individual who has agreed with the person who has filed a flight itinerary to ensure that the following are notified in the manner prescribed in this Division, if the aircraft is overdue, namely,

(a) an air traffic control unit, a flight service station or a community aerodrome radio station, or

(b) a Rescue Co-ordination Centre. (*personne de confiance*)

Pre-flight Information

602.71 The pilot-in-command of an aircraft shall, before commencing a flight, be familiar with the available information that is appropriate to the intended flight.

Weather Information

602.72 The pilot-in-command of an aircraft shall, before commencing a flight, be familiar with the available weather information that is appropriate to the intended flight.

Requirement to File a Flight Plan or a Flight Itinerary

602.73 (1) Subject to subsection (3), no pilot-in-command shall operate an aircraft in IFR flight unless an IFR flight plan has been filed.

(2) No pilot-in-command shall operate an aircraft in VFR flight unless a VFR flight plan or a VFR flight itinerary has been filed, except where the flight is conducted within 25 nautical miles of the departure aerodrome.

(3) A pilot-in-command may file an IFR flight itinerary instead of an IFR flight plan where

(a) the flight is conducted in part or in whole outside controlled airspace; or

(b) facilities are inadequate to permit the communication of flight plan information to an air traffic control unit, a flight service station or a community aerodrome radio station.

(4) Notwithstanding anything in this Division, no pilot-in-command shall, unless a flight plan has been filed, operate an aircraft between Canada and a foreign state.

Contents of a Flight Plan or a Flight Itinerary

602.74 A flight plan or flight itinerary shall contain such information as is specified by the Minister in the *Canada Flight Supplement*.

Filing of a Flight Plan or a Flight Itinerary

602.75 (1) A flight plan shall be filed with an air traffic control unit, a flight service station or a community aerodrome radio station.

(2) A flight itinerary shall be filed with a responsible person, an air traffic control unit, a flight service station or a community aerodrome radio station.

(3) A flight plan or flight itinerary shall be filed by

(a) sending, delivering or otherwise communicating the flight plan or flight itinerary or the information contained therein; and

(b) receiving acknowledgement that the flight plan or flight itinerary or the information contained therein has been received.

Changes in the Flight Plan

602.76 (1) The pilot-in-command of an aircraft for which an IFR flight plan or an IFR flight itinerary has been filed shall follow the procedure set out in subsection (2) where the pilot-in-command intends to make any change in the plan or itinerary in respect of

(a) the cruising altitude or cruising flight level;

(b) the route of flight;

(c) the destination aerodrome;

(d) in the case of a flight plan, the true airspeed at the cruising altitude or cruising flight level, where the change intended is five per cent or more of the true airspeed specified in the IFR flight plan; or

(e) the Mach number, where the change intended is .01 or more of the Mach number that has been included in the air traffic control clearance.

(2) A pilot-in-command of an aircraft who intends to make any of the changes in the IFR flight plan or the IFR flight itinerary that are referred to in subsection (1) shall

- (a) notify as soon as practicable an air traffic control unit or the responsible person, as the case may be, of the intended change; and
- (b) where the flight is being conducted in controlled airspace, receive an air traffic control clearance before making the intended change.

(3) The pilot-in-command of an aircraft for which a VFR flight plan or a VFR flight itinerary has been filed shall follow the procedure set out in subsection (4) where the pilot-in-command intends to make a change in the plan or itinerary in respect of

- (a) the route of flight;
- (b) the duration of the flight; or
- (c) the destination aerodrome.

(4) A pilot-in-command of an aircraft who intends to make any of the changes in the VFR flight plan or the VFR flight itinerary that are referred to in subsection (3) shall notify as soon as practicable an air traffic control unit, a flight service station, a community aerodrome radio station or the responsible person, of the intended change.

Requirement to File an Arrival Report

602.77 (1) Subject to subsections (3) and (4), a pilot-in-command of an aircraft who terminates a flight in respect of which a flight plan has been filed under subsection 602.75(1) shall ensure that an arrival report is filed with an air traffic control unit, a flight service station or a community aerodrome radio station as soon as practicable after landing but not later than (amended 2006/06/30)

- (a) the search and rescue action initiation time specified in the flight plan; or
- (b) where no search and rescue action initiation time is specified in the flight plan, one hour after the last reported estimated time of arrival.

(2) Subject to subsection (4), a pilot-in-command of an aircraft who terminates a flight in respect of which a flight itinerary has been filed under subsection 602.75(2) shall ensure that an arrival report is filed with an air traffic control unit, a flight service station, a community aerodrome radio station or, if the flight itinerary was filed with a responsible person, the responsible person, as soon as practicable after landing but not later than (amended 2006/06/30)

- (a) the search and rescue action initiation time specified in the flight itinerary; or
- (b) where no search and rescue action initiation time is specified in the flight itinerary, 24 hours after the last reported estimated time of arrival.

(3) A pilot-in-command who terminates an IFR flight at an aerodrome where there is an operating air traffic control unit or flight service station is not required to file an arrival report unless requested to do so by the appropriate air traffic control unit.

(4) A pilot-in-command of an aircraft who conducts a flight in respect of which a flight plan or flight itinerary has been filed with an air traffic control unit, flight service station or community aerodrome radio station may file an arrival report by closing the flight plan or flight itinerary with an air traffic control unit, flight service station or community aerodrome radio station prior to landing.

(amended 2006/06/30)

Contents of an Arrival Report

602.78 An arrival report shall contain such information as is specified by the Minister in the *Canada Flight Supplement*.

Overdue Aircraft Report

602.79 Any person who assumes responsibilities with respect to an aircraft and who has reason to believe that the aircraft is overdue, or any other person who has been directed by that person to do so, shall immediately, by the quickest means available,

(a) notify an air traffic control unit, a flight service station, a community aerodrome radio station or a Rescue Co-ordination Centre; and

(b) provide, to the best of the person's knowledge, all of the available information concerning the overdue aircraft that may be requested by the air traffic control unit, the flight service station, the community aerodrome radio station or the Rescue Co-ordination Centre.

602.80 to 602.85 Reserved

DIVISION IV - PRE-FLIGHT AND FUEL REQUIREMENTS

Carry-on Baggage, Equipment and Cargo

602.86 (1) No person shall operate an aircraft with carry-on baggage, equipment or cargo on board, unless the carry-on baggage, equipment and cargo are

(a) stowed in a bin, compartment, rack or other location that is certified in accordance with the aircraft type certificate in respect of the stowage of carry-on baggage, equipment or cargo; or

(b) restrained so as to prevent them from shifting during movement of the aircraft on the surface and during take-off, landing and in-flight turbulence.

(2) No person shall operate an aircraft with carry-on baggage, equipment or cargo on board unless

(a) the safety equipment, the normal and emergency exits that are accessible to passengers and the aisles between the flight deck and a passenger compartment are not wholly or partially blocked by carry-on baggage, equipment or cargo;

(b) all of the equipment and cargo that are stowed in a passenger compartment are packaged or covered to avoid possible injury to persons on board;

(c) where the aircraft is type-certificated to carry 10 or more passengers and passengers are carried on board,

(i) no passenger's view of any "seat belt" sign, "no smoking" sign or exit sign is obscured by carry-on baggage, equipment or cargo except if an auxiliary sign is visible to the passenger or another means of notification of the passenger is available,

(ii) all of the passenger service carts and trolleys are securely restrained during movement of the aircraft on the surface, take-off and landing, and during in-flight turbulence where the pilot-in-command or in-charge flight attendant has directed that the cabin be secured pursuant to subsection 605.25(3) or (4), and

(iii) all of the video monitors that are suspended from the ceiling of the aircraft and extend into an aisle are stowed and securely restrained during take-off and landing; and

(d) all of the cargo that is stowed in a compartment to which crew members have access is stowed in such a manner as to allow a crew member to effectively reach all parts of the compartment with a hand-held fire extinguisher.

Crew Member Instructions

602.87 The pilot-in-command of an aircraft shall ensure that each crew member, before acting as a crew member on board the aircraft, has been instructed with respect to

(a) the duties that the crew member is to perform; and

(b) the location and use of all of the normal and emergency exits and of all of the emergency equipment that is carried on board the aircraft.

Fuel Requirements

602.88 (1) This section does not apply in respect of any glider, balloon or ultra-light aeroplane.

(2) No pilot-in-command of an aircraft shall commence a flight or, during flight, change the destination aerodrome set out in the flight plan or flight itinerary, unless the aircraft carries sufficient fuel to ensure compliance with subsections (3) to (5).

(3) An aircraft operated in VFR flight shall carry an amount of fuel that is sufficient to allow the aircraft

(a) in the case of an aircraft other than a helicopter,

(i) when operated during the day, to fly to the destination aerodrome and then to fly for a period of 30 minutes at normal cruising speed, or

(ii) when operated at night, to fly to the destination aerodrome and then to fly for a period of 45 minutes at normal cruising speed; or

(b) in the case of a helicopter, to fly to the destination aerodrome and then to fly for a period of 20 minutes at normal cruising speed.

(4) An aircraft operated in IFR flight shall carry an amount of fuel that is sufficient to allow the aircraft

(a) in the case of a propeller-driven aeroplane,

(i) where an alternate aerodrome is specified in the flight plan or flight itinerary, to fly to and execute an approach and a missed approach at the destination aerodrome, to fly to and land at the alternate aerodrome and then to fly for a period of 45 minutes, or

(ii) where an alternate aerodrome is not specified in the flight plan or flight itinerary, to fly to and execute an approach and a missed approach at the destination aerodrome and then to fly for a period of 45 minutes; or

(b) in the case of a turbo-jet-powered aeroplane or a helicopter,

(i) where an alternate aerodrome is specified in the flight plan or flight itinerary, to fly to and execute an approach and a missed approach at the destination aerodrome, to fly to and land at the alternate aerodrome and then to fly for a period of 30 minutes, or

(ii) where an alternate aerodrome is not specified in the flight plan or flight itinerary, to fly to and execute an approach and a missed approach at the destination aerodrome and then to fly for a period of 30 minutes.

(5) Every aircraft shall carry an amount of fuel that is sufficient to provide for

(a) taxiing and foreseeable delays prior to take-off;

(b) meteorological conditions;

(c) foreseeable air traffic routings and traffic delays;

(d) landing at a suitable aerodrome in the event of loss of cabin pressurization or, in the case of a multi-engined aircraft, failure of any engine, at the most critical point during the flight; and

(e) any other foreseeable conditions that could delay the landing of the aircraft.

Passenger Briefings

602.89 (1) The pilot-in-command of an aircraft shall ensure that all of the passengers on board the aircraft are briefed before take-off with respect to the following, where applicable:

(a) the location and means of operation of emergency and normal exits;

(b) the location and means of operation of safety belts, shoulder harnesses and restraint devices;

(c) the positioning of seats and the securing of seat backs and chair tables;

(d) the stowage of carry-on baggage;

(e) where the aircraft is unpressurized and it is possible that the flight will require the use of oxygen by the passengers, the location and means of operation of oxygen equipment; and

(f) any prohibition against smoking.

(2) The pilot-in-command of an aircraft shall ensure that all of the passengers on board the aircraft are briefed

(a) in the case of an over-water flight where the carriage of life preservers, individual flotation devices or personal flotation devices is required pursuant to section 602.62, before commencement of the over-water portion of the flight, with respect to the location and use of those items; and

(b) in the case of a pressurized aircraft that is to be operated at an altitude above FL 250, before the aircraft reaches FL 250, with respect to the location and means of operation of oxygen equipment.

(3) The pilot-in-command of an aircraft shall, before take-off, ensure that all of the passengers on board the aircraft are provided with information respecting the location and use of

(a) first aid kits and survival equipment;

(b) where the aircraft is a helicopter or a small aircraft that is an aeroplane, any ELT that is required to be carried on board pursuant to section 605.38; and

(c) any life raft that is required to be carried on board pursuant to section 602.63.

602.90 to 602.95 Reserved

DIVISION V - OPERATIONS AT OR IN THE VICINITY OF AN AERODROME

General

602.96 (1) This section applies to persons operating VFR or IFR aircraft at or in the vicinity of an uncontrolled or controlled aerodrome.

(2) Before taking off from, landing at or otherwise operating an aircraft at an aerodrome, the pilot-in-command of the aircraft shall be satisfied that

(a) there is no likelihood of collision with another aircraft or a vehicle; and

(b) the aerodrome is suitable for the intended operation.

(3) The pilot-in-command of an aircraft operating at or in the vicinity of an aerodrome shall

(a) observe aerodrome traffic for the purpose of avoiding a collision;

(b) conform to or avoid the pattern of traffic formed by other aircraft in operation;

(c) make all turns to the left when operating within the aerodrome traffic circuit, except where right turns are specified by the Minister in the *Canada Flight Supplement* or where otherwise authorized by the appropriate air traffic control unit;

(d) where the aerodrome is an airport, comply with any airport operating restrictions specified by the Minister in the *Canada Flight Supplement*;

(e) where practicable, land and take off into the wind unless otherwise authorized by the appropriate air traffic control unit;

(f) maintain a continuous listening watch on the appropriate frequency for aerodrome control communications or, if this is not possible and an air traffic control unit is in operation at the aerodrome, keep a watch for such instructions as may be issued by visual means by the air traffic control unit; and

(g) where the aerodrome is a controlled aerodrome, obtain from the appropriate air traffic control unit, either by radio communication or by visual signal, clearance to taxi, take off from or land at the aerodrome.

(4) Unless otherwise authorized by the appropriate air traffic control unit, no pilot-in-command shall operate an aircraft at an altitude of less than 2,000 feet over an aerodrome except for the purpose of landing or taking off or if the aircraft is operated pursuant to subsection (5).

(5) Where it is necessary for the purposes of the operation in which the aircraft is engaged, a pilot-in-command may operate an aircraft at an altitude of less than 2,000 feet over an aerodrome, where it is being operated

(a) in the service of a police authority;

(b) for the purpose of saving human life;

(c) for fire-fighting or air ambulance operations;

(d) for the purpose of the administration of the *Fisheries Act* or the *Coastal Fisheries Protection Act*;

(e) for the purpose of the administration of the national or provincial parks;

(f) for the purpose of flight inspection;

(g) for the purpose of aerial application or aerial inspection;

(h) for the purpose of highway or city traffic patrol;

(i) for the purpose of aerial photography conducted by the holder of an air operator certificate;

(j) for the purpose of helicopter external load operations; or

(k) for the purpose of flight training conducted by the holder of a flight training unit operator certificate.

(6) No person shall conduct a take-off or landing at a designated airport without an aircraft fire-fighting service in an aeroplane in respect of which a type certificate has been issued authorizing the transport of 20 or more passengers if the aeroplane is operated under (amended 2003/03/01)

(a) Part VI, Subpart 4; or

(b) Part VII, Subpart 1 or 5.

(7) Subsection (6) does not apply in respect of (amended 2003/03/01)

- (a) a cargo flight without passengers,
- (b) a ferry flight,
- (c) a positioning flight,
- (d) a training flight if no fare-paying passengers are on board;
- (e) the arrival of an aeroplane when the airport is being used for a diversion or as an alternate aerodrome; or
- (f) the subsequent departure of an aeroplane referred to in paragraph (e) if
 - (i) the air operator or private operator has notified the operator of the designated airport of the intended time of departure,
 - (ii) the operator of the designated airport has advised the air operator or private operator that aircraft fire-fighting services cannot be made available within one hour after the later of the time that notification was given under subparagraph (i) and the time of landing, and
 - (iii) the pilot-in-command and the operations manager of the air operator or private operator have agreed that the aeroplane will depart without aircraft fire-fighting services being available.

***VFR and IFR Aircraft Operations at Uncontrolled
Aerodromes within an MF Area***

602.97 (1) Subject to subsection (3), no pilot-in-command shall operate a VFR or IFR aircraft within an MF area unless the aircraft is equipped with radiocommunication equipment pursuant to Subpart 5.

(2) The pilot-in-command of a VFR or IFR aircraft operating within an MF area shall maintain a listening watch on the mandatory frequency specified for use in the MF area.

(3) The pilot-in-command of a VFR aircraft that is not equipped with the radiocommunication equipment referred to in subsection (1) may operate the aircraft to or from an uncontrolled aerodrome that lies within an MF area if

- (a) a ground station is in operation at the aerodrome;
- (b) prior notice of the pilot-in-command's intention to operate the aircraft at the aerodrome has been given to the ground station;
- (c) when conducting a take-off, the pilot-in-command ascertains by visual observation that there is no likelihood of collision with another aircraft or a vehicle during take-off; and
- (d) when approaching for a landing, the aircraft enters the aerodrome traffic circuit from a position that will require it to complete two sides of a rectangular circuit before turning onto the final approach path.

General MF Reporting Requirements

602.98 (1) Every report made pursuant to this Division shall be made on the mandatory frequency that has been specified for use in the applicable MF area.

(2) Every report referred to in subsection (1) shall be

(a) directed to the ground station associated with the MF area, if a ground station exists and is in operation; or

(b) broadcast, if a ground station does not exist or is not in operation.

***MF Reporting Procedures before Entering
Manoeuvring Area***

602.99 The pilot-in-command of a VFR or IFR aircraft that is operated at an uncontrolled aerodrome that lies within an MF area shall report the pilot-in-command's intentions before entering the manoeuvring area of the aerodrome.

MF Reporting Procedures on Departure

602.100 The pilot-in-command of a VFR or IFR aircraft that is departing from an uncontrolled aerodrome that lies within an MF area shall

(a) before moving onto the take-off surface, report the pilot-in-command's departure procedure intentions;

(b) before take-off, ascertain by radiocommunication and by visual observation that there is no likelihood of collision with another aircraft or a vehicle during take-off; and

(c) after take-off, report departing from the aerodrome traffic circuit.

MF Reporting Procedures on Arrival

602.101 The pilot-in-command of a VFR aircraft arriving at an uncontrolled aerodrome that lies within an MF area shall report

(a) before entering the MF area and, where circumstances permit, shall do so at least five minutes before entering the area, giving the aircraft's position, altitude and estimated time of landing and the pilot-in-command's arrival procedure intentions;

(b) when joining the aerodrome traffic circuit, giving the aircraft's position in the circuit;

(c) when on the downwind leg, if applicable;

(d) when on final approach; and

(e) when clear of the surface on which the aircraft has landed.

***MF Reporting Procedures When Flying
Continuous Circuits***

602.102 The pilot-in-command of a VFR aircraft carrying out continuous circuits at an uncontrolled aerodrome that lies within an MF area shall report

- (a) when joining the downwind leg of the circuit;
- (b) when on final approach, stating the pilot-in-command's intentions; and
- (c) when clear of the surface on which the aircraft has landed.

Reporting Procedures When Flying through an MF Area

602.103 The pilot-in-command of an aircraft flying through an MF area shall report

- (a) before entering the MF area and, where circumstances permit, shall do so at least five minutes before entering the area, giving the aircraft's position and altitude and the pilot-in-command's intentions; and
- (b) when clear of the MF area.

***Reporting Procedures for IFR Aircraft When
Approaching or Landing at an Uncontrolled Aerodrome***

602.104 (1) This section applies to persons operating IFR aircraft when approaching or landing at an uncontrolled aerodrome, whether or not the aerodrome lies within an MF area.

(2) The pilot-in-command of an IFR aircraft who intends to conduct an approach to or a landing at an uncontrolled aerodrome shall report

- (a) the pilot-in-command's intentions regarding the operation of the aircraft
 - (i) five minutes before the estimated time of commencing the approach procedure, stating the estimated time of landing,
 - (ii) when commencing a circling manoeuvre, and
 - (iii) as soon as practicable after initiating a missed approach procedure; and
- (b) the aircraft's position
 - (i) when passing the fix outbound, where the pilot-in-command intends to conduct a procedure turn or, if no procedure turn is intended, when the aircraft first intercepts the final approach course,
 - (ii) when passing the final approach fix or three minutes before the estimated time of landing where no final approach fix exists, and
 - (iii) on final approach.

Noise Operating Criteria

602.105 No person shall operate an aircraft at or in the vicinity of an aerodrome except in accordance with the applicable noise abatement procedures and noise control requirements specified by the Minister in the *Canada Air Pilot* or *Canada Flight Supplement*, including the procedures and requirements relating to

- (a) preferential runways;
- (b) minimum noise routes;
- (c) hours when aircraft operations are prohibited or restricted;
- (d) arrival procedures;
- (e) departure procedures;
- (f) duration of flights;
- (g) the prohibition or restriction of training flights;
- (h) VFR or visual approaches;
- (i) simulated approach procedures; and
- (j) the minimum altitude for the operation of aircraft in the vicinity of the aerodrome.

Noise-Restricted Runways

602.106 (1) Subject to subsection (2), no person shall operate a subsonic turbo-jet aeroplane that has a maximum certificated take-off weight of more than 34 000 kg (74,956 pounds) on take-off at a noise-restricted runway set out in column II of an item of the table to this section at an aerodrome set out in column I of that item, unless there is on board

- (a) a certificate of airworthiness indicating that the aeroplane meets the applicable noise emission standards;
- (b) a certificate of noise compliance issued in respect of the aeroplane; or
- (c) where the aeroplane is not a Canadian aircraft, a document issued by the state of registry that specifies that the aeroplane meets the applicable noise emission requirements of that state.

(2) Subsection (1) does not apply

- (a) to the extent that it is inconsistent with any obligation assumed by Canada in respect of a foreign state in a treaty, convention or agreement;
- (b) where the pilot-in-command of an aircraft has declared an emergency; or

- (c) where an aircraft is operated on
- (i) an air evacuation operation,
 - (ii) any other emergency air operation, or
 - (iii) a departure from an aerodrome at which it was required to land because of an emergency.

Table

Item	COLUMN I	COLUMN II
	Aerodrome*	Noise-restricted Runways for Take-off*
1.	Vancouver International Airport	08L, 08R, 12, 26R (amended 1999/12/09)
2.	Calgary International Airport	07, 10, 16, 25, 28
3.	Edmonton City Centre (Blatchford Field) Airport	All runways
4.	Edmonton International Airport	12
5.	Winnipeg / James Armstrong Richardson International Airport (amended 2009/06/04)	13, 18
6.	Hamilton Airport	06
7.	Toronto/Lester B. Pearson International Airport	05, 06L, 06R, 15L, 15R (amended 2005/05/31)
8.	Ottawa/Macdonald-Cartier International Airport	32
9.	Montréal/Pierre Elliott Trudeau International Airport (amended 2004/02/24)	All runways

* Information taken from the aeronautical information publication of the Department of Transport entitled *Canada Flight Supplement*.

602.107 to 602.113 Reserved

DIVISION VI - VISUAL FLIGHT RULES

Minimum Visual Meteorological Conditions for VFR Flight in Controlled Airspace

602.114 No person shall operate an aircraft in VFR flight within controlled airspace unless

- (a) the aircraft is operated with visual reference to the surface;
- (b) flight visibility is not less than three miles;
- (c) the distance of the aircraft from cloud is not less than 500 feet vertically and one mile horizontally; and

- (d) where the aircraft is operated within a control zone,
 - (i) when reported, ground visibility is not less than three miles, and
 - (ii) except when taking off or landing, the distance of the aircraft from the surface is not less than 500 feet.

***Minimum Visual Meteorological Conditions for
VFR Flight in Uncontrolled Airspace***

602.115 No person shall operate an aircraft in VFR flight within uncontrolled airspace unless

- (a) the aircraft is operated with visual reference to the surface;
- (b) where the aircraft is operated at or above 1,000 feet AGL
 - (i) during the day, flight visibility is not less than one mile,
 - (ii) during the night, flight visibility is not less than three miles, and
 - (iii) in either case, the distance of the aircraft from cloud is not less than 500 feet vertically and 2,000 feet horizontally;
- (c) where the aircraft is not a helicopter and is operated at less than 1,000 feet AGL
 - (i) during the day, flight visibility is not less than two miles, except if otherwise authorized in an air operator certificate or a private operator certificate,
 - (ii) during the night, flight visibility is not less than three miles, and
 - (iii) in either case, the aircraft is operated clear of cloud; and
- (d) where the aircraft is a helicopter and is operated at less than 1,000 feet AGL
 - (i) during the day, flight visibility is not less than one mile, except if otherwise authorized in an air operator certificate or a flight training unit operator certificate - helicopter,
 - (ii) during the night, flight visibility is not less than three miles, and
 - (iii) in either case, the aircraft is operated clear of cloud.

VFR Over-the-Top

602.116 Notwithstanding paragraphs 602.114(a) and 602.115(a), an aircraft may be operated in VFR OTT flight during the cruise portion of the flight during the day if

- (a) the aircraft is operated at a vertical distance from cloud of at least 1,000 feet;
- (b) where the aircraft is operated between two cloud layers, the vertical distance between the layers is at least 5,000 feet;
- (c) flight visibility at the cruising altitude of the aircraft is at least five miles; and

(d) the weather at the aerodrome of destination is forecast to have a sky condition of scattered cloud or clear and a ground visibility of five miles or greater with no forecast of precipitation, fog, thunderstorms or blowing snow, and those conditions are forecast to exist

(i) where the forecast is an aerodrome forecast (TAF), for the period from one hour before to two hours after the estimated time of arrival; and

(ii) where an aerodrome forecast (TAF) is not available and the forecast is an area forecast (FA), for the period from one hour before to three hours after the estimated time of arrival.

Special VFR Flight

602.117 (1) Notwithstanding paragraph 602.114(b), an aircraft may be operated in special VFR flight within a control zone if

(a) weather conditions preclude compliance with paragraph 602.114(b);

(b) flight visibility is not less than

(i) one mile, where the aircraft is not a helicopter, or

(ii) one-half mile, where the aircraft is a helicopter;

(c) the aircraft is operated clear of cloud and with visual reference to the surface at all times; and

(d) authorization to do so has been requested and obtained from the appropriate air traffic control unit.

(2) Where aerodrome traffic permits, an air traffic control unit shall authorize a pilot-in-command to operate an aircraft in special VFR flight within a control zone if

(a) the pilot-in-command requests authorization to operate the aircraft in special VFR flight;

(b) when reported, ground visibility within the control zone is not less than

(i) one mile, where the aircraft is not a helicopter, or

(ii) one-half mile, where the aircraft is a helicopter;

(c) the aircraft is equipped with radiocommunication equipment capable of maintaining communication with the appropriate air traffic control unit; and

(d) the aircraft is not a helicopter and is operated during the night, and the authorization is for the purpose of allowing the aircraft to land at the destination aerodrome.

(amended 2006/06/30)

602.118 to 602.120 Reserved

DIVISION VII - INSTRUMENT FLIGHT RULES***General Requirements***

602.121 (1) No pilot-in-command shall operate an aircraft in IMC in any class of airspace, except in accordance with IFR.

(2) No pilot-in-command of an aircraft shall conduct an IFR flight within controlled airspace unless the aircraft is operated in accordance with an air traffic control clearance pursuant to section 602.31.

Alternate Aerodrome Requirements

602.122 Except as otherwise authorized by the Minister in an air operator certificate or in a private operator certificate, no pilot-in-command shall operate an aircraft in IFR flight unless the IFR flight plan or IFR flight itinerary that has been filed for the flight pursuant to section 602.73 includes an alternate aerodrome having a landing area suitable for use by that aircraft.

Alternate Aerodrome Weather Minima

602.123 No pilot-in-command of an aircraft shall include an alternate aerodrome in an IFR flight plan or IFR flight itinerary unless available weather information indicates that the ceiling and visibility at the alternate aerodrome will, at the expected time of arrival, be at or above the alternate aerodrome weather minima specified in the *Canada Air Pilot*.

Minimum Altitudes to Ensure Obstacle Clearance

602.124 (1) Subject to subsections (2) and (3), the pilot-in-command of an IFR aircraft shall, except when taking off or landing, or when being radar-vectorred by an air traffic control unit, ensure that the aircraft is operated at or above

- (a) the MOCA, when the aircraft is on an airway or air route; and
- (b) the minimum altitude established by the Minister to ensure obstacle clearance and specified on an IFR chart, when the aircraft is within airspace in respect of which such a minimum altitude has been established.

(2) When an aircraft referred to in subsection (1) is not being operated on an airway or air route or within airspace in respect of which a minimum altitude referred to in paragraph (1)(b) has been established, the pilot-in-command shall ensure that the aircraft is operated at or above

- (a) an altitude of 1,000 feet above the highest obstacle located within a horizontal distance of five nautical miles from the estimated position of the aircraft in flight;
- (b) in a region designated as a mountainous region in the *Designated Airspace Handbook* and identified therein as area 1 or 5, an altitude of 2,000 feet above the highest obstacle within a horizontal distance of five nautical miles from the estimated position of the aircraft in flight; and

(c) in a region designated as a mountainous region in the *Designated Airspace Handbook* and identified therein as area 2, 3 or 4, an altitude of 1,500 feet above the highest obstacle within a horizontal distance of five nautical miles from the estimated position of the aircraft in flight.

(3) If aviation safety would be at risk as a result of the presence of obstacles to air navigation, the Minister may issue a NOTAM that establishes a higher minimum altitude requirement than that referred to in subsection (1) or (2).

Enroute IFR Position Reports

602.125 (1) The pilot-in-command of an IFR aircraft shall transmit position reports over compulsory reporting points specified on an IFR chart unless advised by the appropriate air traffic control unit that the aircraft is radar-identified.
(amended 2006/06/30)

(2) A position report transmitted pursuant to subsection (1) shall contain the information specified by the Minister in the *Canada Flight Supplement*.

Take-off Minima

602.126 (1) No pilot-in-command of an aircraft shall conduct a take-off if the take-off visibility, as determined in accordance with subsection (2), is below the minimum take-off visibility specified in

- (a) the air operator certificate where the aircraft is operated in accordance with Part VII;
- (b) the private operator certificate where the aircraft is operated in accordance with Subpart 4; or
- (c) the *Canada Air Pilot* in any case other than a case described in paragraph (a) or (b).

(2) For the purposes of subsection (1), the take-off visibility is

- (a) the RVR of the runway, if the RVR is reported to be at or above the minimum take-off visibility specified in a document or the manual referred to in subsection (1);
- (b) the ground visibility of the aerodrome for the runway, if the RVR

- (i) is reported to be less than the minimum take-off visibility specified in a document or the manual referred to in subsection (1),

- (ii) is reported to vary between distances less than and greater than the minimum take-off visibility specified in the *Canada Air Pilot* or a certificate referred to in subsection (1), or

(amended 2006/12/01)

- (iii) is not reported; or

- (c) the runway visibility as observed by the pilot-in-command, if
(amended 2006/12/01)

- (i) the RVR is not reported, and

- (ii) the ground visibility of the aerodrome is not reported.

Instrument Approaches

602.127 (1) Unless otherwise authorized by the appropriate air traffic control unit, the pilot-in-command of an IFR aircraft shall, when conducting an approach to an aerodrome or a runway, ensure that the approach is made in accordance with the instrument approach procedure.

(2) No pilot-in-command of an IFR aircraft shall commence an instrument approach procedure unless the aircraft altimeter is set to an altimeter setting that is usable at the aerodrome where the approach is to be conducted.

Landing Minima

602.128 (1) No pilot-in-command of an IFR aircraft shall conduct an instrument approach procedure except in accordance with the minima specified in the *Canada Air Pilot* or the route and approach inventory.

(2) No pilot-in-command of an IFR aircraft shall, unless the required visual reference necessary to continue the approach to land has been established,

(a) in the case of a CAT I or CAT II precision approach, continue the final approach descent below the decision height; or
(amended 2006/12/01)

(b) in the case of a non-precision approach, descend below the minimum descent altitude.

(3) Where the pilot-in-command of an IFR aircraft conducting an instrument approach does not establish the required visual reference referred to in subsection (2), the pilot-in-command shall initiate a missed approach procedure

(a) in the case of a CAT I or CAT II precision approach, at decision height; and
(amended 2006/12/01)

(b) in the case of a non-precision approach, at the missed approach point.

(4) Notwithstanding anything in this Division, no pilot-in-command of an IFR aircraft shall conduct a precision approach to CAT II or CAT III minima unless

(a) the flight crew has received the training specified in the *Manual of All Weather Operations* (Categories II and III); and

(b) the aircraft is operated in accordance with the procedures, the equipment requirements and the limitations specified in the manual referred to in paragraph (a).

Approach Ban - General

602.129 (1) This section does not apply in respect of aircraft operated under Part VII.
(amended 2006/12/01)

(2) For the purposes of subsection (4), the RVR with respect to an aeroplane is less than the minimum RVR if
(amended 2006/12/01)

- (a) where the RVR is measured by RVR "A" and RVR "B", the RVR measured by RVR "A" for the runway of intended approach is less than 1,200 feet or the RVR measured by RVR "B" for the runway of intended approach is less than 600 feet; or
 - (b) where the RVR is measured by only one of RVR "A" and RVR "B", the RVR for the runway of intended approach is less than 1,200 feet.
- (3) For the purposes of subsection (4), the RVR with respect to a helicopter is less than the minimum RVR if
(amended 2006/12/01)
- (a) where the RVR is measured by RVR "A" and RVR "B", the RVR measured by RVR "A" for the surface of intended approach is less than 1,200 feet; or
 - (b) where the RVR is measured by only one of RVR "A" and RVR "B", the RVR for the surface of intended approach is less than 1,200 feet.
- (4) Where the RVR is reported to be less than the minimum RVR set out in subsection (2) or (3), as applicable, no person shall continue an instrument approach in an IFR aircraft unless
(amended 2006/12/01)
- (a) at the time the RVR report is received, the aircraft has passed the FAF inbound or, where there is no FAF, the point where the final approach course is intercepted;
 - (b) the aircraft is on a training flight where a landing is not intended and the appropriate air traffic control unit is informed that a missed approach procedure will be initiated at or above the decision height or minimum descent altitude, as appropriate;
 - (c) the RVR is varying between distances less than and greater than the minimum RVR;
 - (d) the RVR is less than the minimum RVR, and the ground visibility at the aerodrome where the runway is located is reported to be at least one quarter of a mile; or
 - (e) the pilot-in-command of the aircraft is conducting a precision approach to CAT III minima.
- (5) No pilot-in-command of an IFR aircraft shall commence a non-precision approach, an APV or a CAT I or CAT II precision approach to an airport where low-visibility procedures are in effect.
(amended 2006/12/01)

Approach Ban - CAT III Precision

(amended 2006/12/01)

602.130 (1) This section does not apply in respect of aircraft operated under Part VII.
(amended 2006/12/01)

(2) No person shall continue a CAT III precision approach in an IFR aircraft beyond the FAF inbound or, where there is no FAF, the point where the final approach course is intercepted, unless the RVR reported is equal to or greater than the minimum RVR specified in the *Canada Air Pilot* in respect of the runway or surface of intended approach for the instrument approach procedure conducted.

(amended 2006/12/01)

Runway Visibility

(amended 2006/12/01)

602.131 (1) When no reading from RVR “A” or RVR “B” for the runway of intended approach is available, runway visibility is assessed

(amended 2006/12/01)

(a) by a pilot holding an instrument rating and in the manner set out in section 622.131 of Standard 622 — *Pilot Assessment of Runway Visibility Standards* of the *General Operating and Flight Rules Standards*; or

(b) by a person qualified in accordance with section 804.26 and in the manner set out in section 804.25.

(2) The assessment of runway visibility is valid only for a period of 20 minutes after it is established.

(amended 2006/12/01)

602.132 Reserved

(amended 2006/12/01)

DIVISION VIII - RADIOCOMMUNICATIONS

***Language Used in Aeronautical
Radiocommunications***

602.133 English and French are the languages of aeronautical radiocommunication in Canada.

***Locations Where Services Are Available in English
and French***

602.134 (1) Any person operating an aircraft who wishes to receive the services referred to in this section in one of either English or French shall so indicate to the appropriate air traffic control unit or flight service station by means of an initial radiocommunication in English or French, as appropriate.

(2) Every flight service station set out in Table 1 to this section and every air traffic control unit set out in Table 3 to this section shall provide advisory services in English and French.

(3) Every air traffic control unit set out in Table 3 to this section shall provide air traffic services in English and French.

(4) Every temporary air traffic control unit located in the province of Quebec shall provide air traffic services in English and French.

(5) Every flight service station set out in Table 2 to this section shall provide, between any person operating an aircraft and any air traffic control unit set out in Table 3 to this section, a relay service of IFR air traffic control messages in English or French, as indicated by that person.

Table 1

**Flight Service Stations where Advisory
Services are Available in English and French**

1. Charlo
2. Gaspé
3. Gatineau
4. Îles-de-la-Madeleine
5. Kuujuaq
6. Kuujuarapik
7. La Grande Rivière
8. Mont-Joli
9. Montréal
10. Québec
11. Roberval
12. Rouyn
13. Sept-Îles
14. Squaw Lake (seasonal station)
15. Val-d'Or

Table 2

**Flight Service Stations where Relay Services
of IFR Air Traffic Control Messages are
Available In English and French**

1. Gaspé
2. Gatineau
3. Îles-de-la-Madeleine
4. Kuujuaq
5. Kuujuarapik
6. La Grande Rivière
7. Mont-Joli
8. Montréal
9. Québec
10. Roberval
11. Rouyn
12. Sept-Îles
13. Squaw Lake (seasonal station)
14. Val-d'Or

Table 3
Air Traffic Control Units where Advisory
Services and Air Traffic Control Services are
Available in English and French

Area Control Centre

1. Montréal

Terminal Control Units

2. Bagotville
3. Montréal
4. Ottawa
5. Québec

Air Traffic Control Towers

6. Bagotville
7. Montréal International (Pierre Elliott Trudeau)
(amended 2004/02/24)
8. Montréal International (Mirabel)
9. Ottawa International (Macdonald-Cartier)
10. Québec International (Jean Lesage)
11. St-Honoré
12. St-Hubert
13. St-Jean (Province of Québec)
14. Sept-Îles

Locations Where Services Are Available in English

602.135 All air traffic control units and flight service stations shall provide aeronautical radiocommunication services in English.

Continuous Listening Watch

602.136 Subject to sections 602.137 and 602.138, where an aircraft is equipped with radiocommunication equipment, the pilot-in-command shall ensure that

- (a) a listening watch is maintained on the appropriate frequency; and
- (b) where communications are required, communication is established with an air traffic control unit, flight service station or community aerodrome radio station, as applicable, on that appropriate frequency.

Two-way Radiocommunication Failure in IFR
Flight

602.137 (1) Where there is a two-way radiocommunication failure between the controlling air traffic control unit and an IFR aircraft that is in or has received a clearance to enter controlled airspace, the pilot-in-command shall

- (a) maintain a listening watch on the appropriate frequency for control messages or further clearance and acknowledge receipt of any such messages, if possible, by any means available;

(b) set the transponder to code 7600; and

(c) attempt to establish communications with any air traffic services facility or other aircraft, inform the facility or aircraft of the difficulty and request it to relay the information to the last air traffic control unit with which communications had been established.

(2) Where communications cannot be established with any air traffic services facility, either directly or by relay through an intermediary, the pilot-in-command shall, except where specific instructions to cover an anticipated communications failure have been received from an air traffic control unit, comply with the procedures specified by the Minister in the *Canada Air Pilot* and the *Canada Flight Supplement*.

Two-way Radiocommunication Failure in VFR Flight

602.138 Where there is a two-way radiocommunication failure between the controlling air traffic control unit and a VFR aircraft while operating in Class B, Class C or Class D airspace, the pilot-in-command shall

(a) leave the airspace

(i) where the airspace is a control zone, by landing at the aerodrome for which the control zone is established, and

(ii) in any other case, by the shortest route;

(b) where the aircraft is equipped with a transponder, set the transponder to code 7600; and

(c) inform an air traffic control unit as soon as possible of the actions taken pursuant to paragraph (a).

602.139 to 602.142 Reserved

DIVISION IX - EMERGENCY COMMUNICATIONS AND SECURITY

Emergency Radio Frequency Capability

602.143 No person shall operate an aircraft equipped with two-way VHF radiocommunication equipment unless the equipment is capable of providing communication on VHF frequency 121.5 MHz.

Interception Signals, Interception of Aircraft and Instructions to Land

602.144 (1) No person shall give an interception signal or an instruction to land except

(a) a peace officer, an officer of a police authority or an officer of the Canadian Forces acting within the scope of their duties; or

(b) a person authorized to do so by the Minister pursuant to subsection (2).

(2) The Minister may authorize a person to give an interception signal or an instruction to land if such authorization is in the public interest and is not likely to affect aviation safety.

(3) The pilot-in-command of an aircraft who receives an instruction to land from a person referred to in subsection (1) shall, subject to any direction received from an air traffic control unit, comply with the instruction.

(4) The pilot-in-command of an intercepting aircraft and the pilot-in-command of an intercepted aircraft shall comply with the rules of interception set out in the *Canada Flight Supplement*.

ADIZ

602.145 (1) This section applies in respect of aircraft before entering into and while operating within the ADIZ, the dimensions of which are specified in the *Designated Airspace Handbook*.

(2) Every flight plan or flight itinerary required to be filed pursuant to this section shall be filed with an air traffic control unit, a flight service station or a community aerodrome radio station.

(3) The pilot-in-command of an aircraft whose point of departure within the ADIZ or last point of departure before entering the ADIZ has facilities for the transmission of flight plan or flight itinerary information shall

(a) before take-off, file a flight plan or flight itinerary;

(b) in the case of a VFR aircraft where the point of departure is outside the ADIZ,

(i) indicate in the flight plan or flight itinerary the estimated time and point of ADIZ entry, and

(ii) as soon as possible after take-off, communicate by radio to an air traffic control unit, a flight service station or a community aerodrome radio station a position report of the aircraft's location, altitude, aerodrome of departure and estimated time and point of ADIZ entry; and

(c) in the case of a VFR aircraft where the point of departure is within the ADIZ, as soon as possible after take-off, communicate by radio to an air traffic control unit, a flight service station or a community aerodrome radio station a position report of the aircraft's location, altitude and aerodrome of departure.

(4) The pilot-in-command of an aircraft whose point of departure within the ADIZ or last point of departure before entering the ADIZ does not have facilities for the transmission of flight plan or flight itinerary information shall

(a) as soon as possible after take-off, file by radiocommunication a flight plan or flight itinerary; and

(b) in the case of a VFR aircraft, indicate in the flight plan or flight itinerary the estimated time and point of ADIZ entry, if applicable.

(5) The pilot-in-command of a VFR aircraft shall revise the estimated time and point of ADIZ entry and inform an air traffic control unit, a flight service station or a community aerodrome radio station, when the aircraft is not expected to arrive

- (a) within plus or minus five minutes of the estimated time at
 - (i) a reporting point,
 - (ii) the point of ADIZ entry, or
 - (iii) the point of destination within the ADIZ; or
- (b) within 20 nautical miles of
 - (i) the estimated point of ADIZ entry, or
 - (ii) the centre line of the route of flight indicated in the flight plan or flight itinerary.

ESCAT Plan

(amended 2002/09/24)

602.146 (1) This section applies in respect of aircraft before entering into and while operating within Canadian domestic airspace or the ADIZ.

(2) The pilot-in-command of an aircraft referred to in subsection (1) who is notified by an air traffic control unit of the implementation of the ESCAT Plan shall
(amended 2002/09/24)

- (a) before take-off, obtain approval for the flight from the appropriate air traffic control unit or flight service station;
- (b) comply with any instruction to land or to change course or altitude that is received from the appropriate air traffic control unit or flight service station; and
- (c) provide the appropriate air traffic control unit or flight service station with position reports
 - (i) when operating within controlled airspace, as required pursuant to section 602.125, and
 - (ii) when operating outside controlled airspace, at least every 30 minutes.

602.147 to 602.149 Reserved

**DIVISION X - NOISE EMISSION LEVELS FOR
SUBSONIC TURBO-JET AEROPLANES**

(amended 2008/09/05)

Requirements

(amended 2008/09/05)

602.150 (1) No person shall operate a subsonic turbo-jet aeroplane that has a maximum certificated take-off weight of 34 000 kg (74,956 pounds) or more to or from an aerodrome other than Gander International Airport unless the aeroplane meets the noise emission standards set out in Chapter 3 or 4 of Volume I, *Aircraft Noise*, of Annex 16 to the Convention.

(amended 2011/01/21)

(2) For the purpose of subsection (1), the following expressions, used in Annex 16 to the Convention, have the following meanings:

(amended 2008/09/05)

(a) “aeroplane” has the same meaning as in subsection 101.01(1);

(amended 2008/09/05)

(b) “maximum certificated take-off mass” has the same meaning as “maximum certificated take-off weight” in subsection 101.01(1); and

(amended 2008/09/05)

(c) “subsonic jet” has the same meaning as “subsonic turbo-jet aeroplane” in subsection (1).

(amended 2008/09/05)



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CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 3 - SPECIAL FLIGHT OPERATIONS

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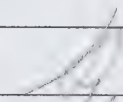
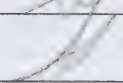
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2007 - 1	2007/06/30	2007/11/16	

* All persons making use of this consolidation are reminded that it is not an "official" copy. The original regulations and amendments thereto, as published in Part II of the *Canada Gazette*, should be consulted for the purpose of officially interpreting and applying the regulations.

[illegible]

603 - SPECIAL FLIGHT OPERATIONS

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PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 3 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS

Certification Requirements for Special Aviation Events

603.01 No person shall conduct a special aviation event unless the person complies with the provisions of a special flight operations certificate - special aviation event issued by the Minister pursuant to section 603.02.

Issuance of Special Flight Operations Certificate - Special Aviation Event

603.02 Subject to section 6.71 of the Act, the Minister shall, on receipt of an application submitted in the form and manner required by ~~and within the time limits specified in the~~ *Special Flight Operations Standards*, issue a special flight operations certificate — special aviation event to an applicant who demonstrates to the Minister the ability to conduct a special aviation event in accordance with the *Special Flight Operations Standards*.
(amended 2006/06/30)

Contents of Special Flight Operations Certificate - Special Aviation Event

603.03 A special flight operations certificate - special aviation event shall contain the following information:

- (a) the name and address of the certificate holder;
- (b) the number of the certificate;
- (c) the date of issue of the certificate;
- (d) the validity period of the certificate;
- (e) the general conditions identified in section 603.04; and
- (f) specific conditions with respect to
 - (i) the types of aircraft authorized to operate at the special aviation event and, if applicable, their registration,
 - (ii) the names and, if applicable, the qualifications of the flight crew members authorized to participate in the special aviation event, and

(iii) any other condition pertaining to the special aviation event that the Minister deems necessary for aviation safety.

***General Conditions of Special Flight Operations
Certificate - Special Aviation Event***

603.04 A special flight operations certificate - special aviation event shall contain the following general conditions:

- (a) the certificate holder shall maintain an adequate management organization;
- (b) the certificate holder shall ensure that participants are
 - (i) qualified for the type of demonstration to be flown, and
 - (ii) provided with a briefing that meets the *Special Flight Operations Standards*; and
- (c) the certificate holder shall conduct the special aviation event in a safe manner.

Event Management

603.05 No person shall conduct a special aviation event unless the person has a management organization that

- (a) is capable of exercising supervision and operational control over
 - (i) persons attending the special aviation event
(amended 2006/06/30)
 - (ii) any flight that is to be operated at the special aviation event;
 - (iii) personnel involved in the conduct of the special aviation event whose duties and responsibilities are specified in the *Special Flight Operations Standards*; and
(amended 2006/06/30)
- (b) meets the *Special Flight Operations Standards*.

Participant and Aircraft Eligibility
(amended 2006/06/30)

603.06 No person shall operate an aircraft or permit an aircraft to be operated in a special aviation event unless the person operating the aircraft and the aircraft
(amended 2006/06/30)

- (a) meet the eligibility requirements specified in section 623.06 of the *Special Flight Operations Standards*; and
(amended 2006/06/30)
- (b) are authorized to do so in a special flight operations certificate — special aviation event.
(amended 2006/06/30)

Minimum Safety Distances and Altitudes
(amended 2006/06/30)

603.07 No person shall operate an aircraft in a special aviation event at a distance from, or at an altitude above, a spectator area, a built-up area or an occupied building if that distance or altitude is less than the minimum specified in section 623.07 of the *Special Flight Operations Standards*.

(amended 2006/06/30)

Weather Conditions

603.08 No person shall operate an aircraft in a special aviation event in weather conditions that are below the minimum conditions specified in the *Special Flight Operations Standards*.

Participant Briefing

603.09 No person shall operate an aircraft in a special aviation event unless the person has received a participant briefing that meets the *Special Flight Operations Standards*.

603.10 to 603.15 Reserved

**DIVISION II - BALLOONS WITH FARE-PAYING
PASSENGERS**

Application

603.16 This Division applies in respect of the operation of a balloon where fare-paying passengers are carried on board.

Certification Requirements for Balloon Operations

603.17 No person shall operate a balloon under this Division unless the person complies with the provisions of a special flight operations certificate - balloons issued by the Minister pursuant to section 603.18.

***Issuance of Special Flight Operations Certificate -
Balloons***

603.18 Subject to section 6.71 of the Act, the Minister shall, on receipt of an application submitted in the form and manner required by the *Special Flight Operations Standards*, issue a special flight operations certificate - balloons to an applicant who demonstrates to the Minister the ability to conduct the flight operation in accordance with the *Special Flight Operations Standards*.

***Contents of Special Flight Operations Certificate -
Balloons***

603.19 A special flight operations certificate - balloons shall contain the following information:

(a) the name and address of the balloon operator;

- (b) the number of the certificate;
- (c) the date of issue of the certificate;
- (d) the general conditions identified in section 603.20; and
- (e) specific conditions with respect to
 - (i) the types and AX class of balloons authorized and, where the balloon is of a special shape or is a foreign-registered balloon, its registration,
 - (ii) the external carriage of passengers, and
 - (iii) any other condition pertaining to the operation that the Minister deems necessary for aviation safety.

***General Conditions of Special Flight Operations
Certificate - Balloons***

603.20 A special flight operations certificate - balloons shall contain the following general conditions:

- (a) the balloon operator shall maintain balloons that are properly equipped for the area of operation and the type of operation;
- (b) the balloon operator shall maintain its balloons in accordance with the requirements of Subpart 5;
- (c) the balloon operator shall employ flight crew members who meet the *Special Flight Operations Standards*; and
- (d) the balloon operator shall conduct a safe operation.

Crew Member Qualifications

603.21 No balloon operator shall permit a person to act and no person shall act as the pilot-in-command of a balloon unless the person meets the qualification and currency requirements set out in the *Special Flight Operations Standards*.

Briefing of Passengers

603.22 The pilot-in-command of a balloon shall ensure that passengers are given a safety briefing that meets the *Special Flight Operations Standards*.

Operations at Night

603.23 No person shall operate a balloon in free flight at night unless

- (a) the balloon is equipped in accordance with section 605.19; and
- (b) landings are conducted during the day.

Tethered Flight

603.24 (1) No person shall operate a balloon in tethered flight with passengers on board unless the pilot-in-command is on board.

(2) The pilot-in-command shall record all time spent in tethered flight as air time for the purpose of maintenance.

Carriage of Passengers

(amended 2006/06/30)

603.25 No person shall operate a balloon with passengers on board unless each passenger is carried in the basket.

(amended 2006/06/30)

603.26 to 603.35 Reserved

(amended 2006/06/30)

DIVISION III - PARACHUTING

Application

603.36 This Division applies in respect of the conduct of parachute descents

(a) in or into controlled airspace or an air route; and

(b) over or into a built-up area or open-air assembly of persons.

Certification Requirements for Parachute Operations

603.37 For the purposes of section 602.26, a pilot-in-command may permit and a person may conduct a parachute descent under this Division if the person complies with the provisions of a special flight operations certificate - parachuting issued by the Minister pursuant to section 603.38.

Issuance of Special Flight Operations Certificate - Parachuting

603.38 Subject to section 6.71 of the Act, the Minister shall, on receipt of an application submitted in the form and manner required by the *Special Flight Operations Standards*, issue a special flight operations certificate - parachuting to an applicant who demonstrates to the Minister the ability to conduct the flight operation in accordance with the *Special Flight Operations Standards*.

Contents of Special Flight Operations Certificate - Parachuting

603.39 A special flight operations certificate - parachuting shall contain the following information:

(a) the name and address of the certificate holder;

- (b) the number of the certificate;
- (c) the date of issue of the certificate;
- (d) the validity period of the certificate;
- (e) the type of flight operation authorized; and
- (f) any condition pertaining to the operation that the Minister deems necessary for aviation safety.

603.40 to 603.64 Reserved

DIVISION IV - MISCELLANEOUS SPECIAL FLIGHT OPERATIONS

Application

603.65 This Division applies in respect of the following flight operations when not conducted under Part VII:

(a) the operation of an aircraft, other than a balloon, for the purpose of conducting a take-off or landing within a built-up area of a city or town at a place other than an airport, heliport or military aerodrome;
(amended 2007/06/30)

(b) the operation of an aircraft for the purpose of conducting aerial application, aerial inspection or aerial photography at altitudes and distances less than those specified in paragraph 602.14(2)(a);

(c) the operation of a helicopter while conducting Class B, C or D external load operations over a built-up area or open-air assembly of persons, including flight at altitudes and distances less than those specified in paragraph 602.14(2)(a);

(d) the operation of an unmanned air vehicle;
(amended 2003/12/01)

(e) the operation of a powered aircraft while persons enter or, except for parachute descents, leave the aircraft in flight; and

(f) the operation of an aircraft while conducting aerobatic manoeuvres

(i) in or into controlled airspace or an air route, or

(ii) below 2,000 feet AGL.

Certification Requirements

603.66 No person shall conduct a flight operation referred to in section 603.65 unless the person complies with the provisions of a special flight operations certificate issued by the Minister pursuant to section 603.67.

Issuance of Special Flight Operations Certificate

603.67 Subject to section 6.71 of the Act, the Minister shall, on receipt of an application submitted in the form and manner required by the *Special Flight Operations Standards*, issue a special flight operations certificate to an applicant who demonstrates to the Minister the ability to conduct the flight operation in accordance with the *Special Flight Operations Standards*.

Contents of Special Flight Operations Certificate

603.68 A special flight operations certificate shall contain the following information:

- (a) the name and address of the certificate holder;
- (b) the number of the certificate;
- (c) the date of issue of the certificate;
- (d) the validity period of the certificate;
- (e) the type of flight operation authorized; and
- (f) any condition pertaining to the operation that the Minister deems necessary for aviation safety.

603.69 to 603.75 Reserved



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CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 4 - PRIVATE OPERATOR PASSENGER TRANSPORTATION



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2005-2	2005/12/15	Apr 18/06	
2009-2	2009/12/01	2010/03/06	

* All persons making use of this consolidation are reminded that it is not an "official" copy. The original regulations and amendments thereto, as published in Part II of the *Canada Gazette*, should be consulted for the purpose of officially interpreting and applying the regulations.

[illegible]

604 - PRIVATE OPERATOR PASSENGER TRANSPORTATION

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PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 4 - PRIVATE OPERATOR PASSENGER TRANSPORTATION

DIVISION I - GENERAL

(amended 2005/11/15)

Interpretation

604.01 In this Subpart,

“Association” means the Canadian Business Aviation Association; (*Association*)

“certificate” means a private operator certificate issued by the Association; (*certificat*)

“Standard 624” means Standard 624 - *Private Operator Passenger Transportation* of the *General Operating and Flight Rules Standards*. (*norme 624*)

Application

604.02 (1) Subject to subsection (2), this Subpart applies in respect of the operation of a Canadian aircraft used for the transport of passengers if

(a) the aircraft is a turbine-powered pressurized aeroplane;

(b) the aircraft is a large aeroplane;

(c) the aircraft is not an aeroplane referred to in paragraph (a) or (b), the operator of that aircraft holds a certificate in respect of an aeroplane referred to in paragraph (a) or (b) and the Association has amended the certificate to include that aircraft; or

(d) the aircraft is authorized by the Minister to be operated under this Subpart.

(2) This Subpart does not apply in respect of an aircraft that is required to be operated under Subpart 6 of Part IV or under Part VII.

Certificate

604.03 No person shall operate an aircraft under this Subpart unless the person

(a) holds a certificate in respect of the aircraft; and

(b) operates the aircraft in accordance with the conditions specified in the certificate.

Management System

604.04 (1) The Association may issue a certificate in respect of an aircraft to be operated under this Subpart if the Association establishes and maintains a management system and abides by it.

(2) The management system shall take into consideration the risks inherent in the operation of the aircraft and shall include policies and procedures respecting

- (a) the consultation with aircraft operators who operate aircraft under this Subpart in order to establish the conditions governing the issuance of a certificate;
- (b) the publication, in both official languages, of the conditions governing the issuance of a certificate;
- (c) the accessibility of the conditions governing the issuance of a certificate;
- (d) the issuance, amendment, suspension and cancellation of a certificate;
- (e) the circumstances in which certain conditions governing the issuance of a certificate will not be required;
- (f) the auditing of a holder of a certificate, on a periodic basis or for cause, to establish whether the conditions governing the issuance of the certificate have been met;
- (g) the resolution of a dispute between the holder of, or applicant for, a certificate and the Association;
- (h) the referral to the Minister for investigation of any case where a person to whom this Subpart applies operates an aircraft without a certificate;
- (i) the collection and analysis of safety data and safety indicators, as they relate to aircraft operated under this Subpart; and
- (j) the issuance of special weather minima authorizations and navigation system authorizations.

Contents of a Certificate

604.05 In addition to any condition pertaining to the operation of an aircraft that is necessary for aviation safety, a certificate may contain operations specifications with respect to

- (a) the special weather minima authorizations referred to in sections 604.21 to 604.24; and
- (b) the navigation system authorization referred to in section 604.25.

Issuance of Authorizations

604.06 The Association shall issue the authorizations referred to in paragraphs 604.05(a) and (b) where the requirements set out in Standard 624 are met.

Ministerial Orders if Safety Compromised

604.07 (1) If the Minister determines that the policies and procedures established and maintained by the Association under section 604.04 have deficiencies that may constitute a hazard to aviation safety, the Minister may, by order, direct the Association to take the necessary measures to correct the deficiencies.

(2) The Association shall take the corrective measures without delay.

604.08 to 604.20 reserved

DIVISION II - FLIGHT OPERATIONS AND TRAINING

VFR Flight Minimum Flight Visibility - Uncontrolled Airspace

604.21 If an aircraft is operated in day VFR flight within uncontrolled airspace at less than 1,000 feet AGL, a person may, for the purposes of subparagraph 602.115(c)(i), operate the aircraft when flight visibility is less than two miles if the person is authorized to do so in a certificate.

No Alternate Aerodrome - IFR Flight

604.22 For the purposes of section 602.122, a person may conduct an IFR flight where an alternate aerodrome has not been designated in the IFR flight plan or in the IFR flight itinerary, if

- (a) the person is authorized to do so in a certificate;
- (b) the person complies with the requirements set out in section 624.22 of Standard 624; and
- (c) for an international flight or a flight in Northern Domestic Airspace, the aircraft carries a fuel reserve of five per cent of the fuel required under section 602.88.

Take-off Minima

604.23 For the purposes of section 602.126, a person may conduct a take-off in an aircraft in IMC where weather conditions are below the take-off minima specified in the instrument approach procedure, if the person

- (a) is authorized to do so in a certificate; and
- (b) complies with the requirements set out in section 624.23 of Standard 624.

Instrument Approach Procedures

604.24 No person shall conduct a CAT II or CAT III instrument approach unless

- (a) the person is authorized to do so in a certificate; and
- (b) the approach is conducted in accordance with the *Manual of All Weather Operations (Categories II and III)*.

Navigation System

604.25 The holder of a certificate may operate an aircraft equipped with a navigation system if the navigation system meets the requirements set out in section 624.25 of Standard 624 and a navigation system authorization in respect of that system has been issued.

Training Program

604.26 The holder of a certificate shall establish and maintain a ground and flight training program that

- (a) is designed to ensure that each person who receives training acquires the competence to perform their assigned duties; and
- (b) meets the requirements set out in section 624.26 of Standard 624.

Aircraft Operating Manual

604.27 (1) The holder of a certificate may establish and maintain an aircraft operating manual that meets the requirements set out in section 624.27 of Standard 624 and that provides guidance to crew members in the operation of the aircraft.

(2) An aircraft operating manual shall contain

- (a) the aircraft operating procedures; and
- (b) where the aircraft flight manual is not carried on board the aircraft, the aircraft performance data and limitations specified in the aircraft flight manual, which shall be clearly identified as aircraft flight manual requirements.

(3) The holder of a certificate who has established an aircraft operating manual shall ensure that a copy of the manual is carried on board each aircraft to which it relates.

Service Difficulty Reporting
(amended 2009/12/01)

604.28 The holder of a certificate shall report to the Minister, in accordance with Division IX of Subpart 21 of Part V, any reportable service difficulty related to any aircraft that it operates.

(amended 2009/12/01)



CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

605 - AIRCRAFT REQUIREMENTS

Canada

Her Majesty the Queen in Right of Canada, represented
by the Minister of Public Works and Government Services, 2006.

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* All persons making use of this consolidation are reminded that it is not an "official" copy. The original regulations and amendments thereto, as published in Part II of the *Canada Gazette*, should be consulted for the purpose of officially interpreting and applying the regulations.

[illegible]

605 - AIRCRAFT REQUIREMENTS

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PART VI - GENERAL OPERATING AND FLIGHT RULES

SUBPART 5 - AIRCRAFT REQUIREMENTS

Application

605.01 (1) This Subpart applies to

- (a) persons operating Canadian aircraft other than ultra-light aeroplanes or hang gliders; and
 - (b) persons operating foreign aircraft in Canada where those persons are Canadian citizens, permanent residents or corporations incorporated by or under the laws of Canada or a province.
- (2) The following requirements apply to persons operating foreign aircraft, other than persons referred to in paragraph (1)(b), while those aircraft are operated in Canada:
- (a) the requirement to carry a flight authority on board the aircraft in accordance with Section 605.03;
 - (b) the requirement that an aircraft be equipped with transponder and automatic pressure-altitude reporting equipment in accordance with Section 605.35;
 - (c) the requirement that an aircraft be equipped with one or more ELTs in accordance with Section 605.38; and
 - (d) radiocommunication and radio navigation equipment requirements that are specific to the aircraft and types of flight referred to in Sections 605.14 to 605.21.

Reserved

605.02

DIVISION I - AIRCRAFT REQUIREMENTS - GENERAL

Flight Authority

605.03 (1) No person shall operate an aircraft in flight unless

- (a) a flight authority is in effect in respect of the aircraft;
 - (b) the aircraft is operated in accordance with the conditions set out in the flight authority; and
 - (c) subject to subsections (2) and (3), the flight authority is carried on board the aircraft.
- (2) Where a specific-purpose flight permit has been issued pursuant to Section 507.04, an aircraft may be operated without the flight authority carried on board where
- (a) the flight is conducted in Canadian airspace; and
 - (b) an entry is made into the journey log indicating
 - (i) that the aircraft is operating under a specific-purpose flight permit, and

(ii) where applicable, any operational conditions that pertain to flight operations under the specific-purpose flight permit.

(3) A balloon may be operated without the flight authority carried on board where the flight authority is immediately available to the pilot-in-command

(a) prior to commencing a flight; and

(b) on completion of the flight.

Availability of Aircraft Flight Manual

605.04 (1) No person shall conduct a take-off in an aircraft for which an aircraft flight manual is required by the applicable standards of airworthiness, unless the aircraft flight manual or, where established under section 604.27 or Part VII, the aircraft operating manual is available to the flight crew members at their duty stations.

(amended 2005/11/15)

(2) The aircraft flight manual or, where an aircraft operating manual is established under section 604.27 or Part VII, those parts of the aircraft flight manual that are incorporated into the aircraft operating manual shall include all of the amendments and supplementary material that are applicable to the aircraft type.

(amended 2005/11/15)

Markings and Placards

605.05 No person shall conduct a take-off in an aircraft in respect of which markings or placards are required by the applicable standards of airworthiness unless the markings or placards are affixed to the aircraft or/ attached to a component of the aircraft in accordance with those standards.

Aircraft Equipment Standards and Serviceability

605.06 No person shall conduct a take-off in an aircraft, or permit another person to conduct a take-off in an aircraft in their custody and control, unless the aircraft equipment required by these Regulations

(a) meets the applicable standards of airworthiness; and

(b) is serviceable and, where required by operational circumstances, functioning, except if otherwise provided in Section 605.08, 605.09 or 605.10.

Minimum Equipment Lists

605.07 (1) The Minister may, in accordance with the *MMEL/MEL Policy and Procedures Manual*, establish a master minimum equipment list for each type of aircraft.

(2) The Minister may supplement a master minimum equipment list that has been issued by the competent authority of a foreign state in respect of a type of aircraft where necessary to ensure compliance with the *MMEL/MEL Policy and Procedures Manual*.

(3) Where a master minimum equipment list has been established for an aircraft type pursuant to subsection (1) or supplemented pursuant to subsection (2), the Minister shall approve a minimum equipment list in respect of each operator of that type of aircraft, if the requirements set out in the *MMEL/MEL Policy and Procedures Manual* are met.

Unserviceable and Removed Equipment - General

605.08 (1) Notwithstanding subsection (2) and Sections 605.09 and 605.10, no person shall conduct a take-off in an aircraft that has equipment that is not serviceable or from which equipment has been removed if, in the opinion of the pilot-in-command, aviation safety is affected.

(2) Notwithstanding Sections 605.09 and 605.10, a person may conduct a take-off in an aircraft that has equipment that is not serviceable or from which equipment has been removed where the aircraft is operated in accordance with the conditions of a flight permit that has been issued specifically for that purpose.

***Unserviceable and Removed Equipment - Aircraft
with a Minimum Equipment List***

605.09 (1) Subject to subsection (2), where a minimum equipment list has been approved in respect of the operator of an aircraft pursuant to subsection 605.07(3), no person shall conduct a take-off in the aircraft with equipment that is not serviceable or that has been removed unless

- (a)** the aircraft is operated in accordance with any conditions or limitations specified in the minimum equipment list; and
- (b)** a copy of the minimum equipment list is carried on board.

(2) Where the conditions or limitations specified in a minimum equipment list are in conflict with the requirements of an airworthiness directive, the airworthiness directive prevails.

***Unserviceable and Removed Equipment - Aircraft
without a Minimum Equipment List***

605.10 (1) Where a minimum equipment list has not been approved in respect of the operator of an aircraft, no person shall conduct a take-off in the aircraft with equipment that is not serviceable or that has been removed, where that equipment is required by

- (a)** the standards of airworthiness that apply to day or night VFR or IFR flight, as applicable;
- (b)** any equipment list published by the aircraft manufacturer respecting aircraft equipment that is required for the intended flight;
- (c)** an air operator certificate, a private operator certificate, a special flight operations certificate or a flight training unit operating certificate;
- (d)** an airworthiness directive; or
- (e)** these Regulations.

(2) Where a minimum equipment list has not been approved in respect of the operator of an aircraft and the aircraft has equipment, other than the equipment required by subsection (1), that is not serviceable or that has been removed, no person shall conduct a take-off in the aircraft unless

- (a)** where the unserviceable equipment is not removed from the aircraft, it is isolated or secured so as not to constitute a hazard to any other aircraft system or to any person on board the aircraft;

(b) the appropriate placards are installed as required by the *Aircraft Equipment and Maintenance Standards*; and

(c) an entry recording the actions referred to in paragraphs (a) and (b) is made in the journey log, as applicable.

Reserved

605.11 to 605.13

DIVISION II - AIRCRAFT EQUIPMENT REQUIREMENTS

Power-driven Aircraft - Day VFR

605.14 No person shall conduct a take-off in a power-driven aircraft for the purpose of day VFR flight unless it is equipped with

- (a) where the aircraft is operated in uncontrolled airspace, an altimeter;
- (b) where the aircraft is operated in controlled airspace, a sensitive altimeter adjustable for barometric pressure;
- (c) an airspeed indicator;
- (d) a magnetic compass or a magnetic direction indicator that operates independently of the aircraft electrical generating system;
- (e) a tachometer for each engine and for each propeller or rotor that has limiting speeds established by the manufacturer;
- (f) an oil pressure indicator for each engine employing an oil pressure system;
- (g) a coolant temperature indicator for each liquid-cooled engine;
- (h) an oil temperature indicator for each air-cooled engine having a separate oil system;
- (i) a manifold pressure gauge for each
 - (i) reciprocating engine equipped with a variable-pitch propeller,
 - (ii) reciprocating engine used to power a helicopter,
 - (iii) supercharged engine, and
 - (iv) turbocharged engine;
- (j) a means for the flight crew, when seated at the flight controls to determine
 - (i) the fuel quantity in each main fuel tank, and
 - (ii) if the aircraft employs retractable landing gear, the position of the landing gear;
- (k) subject to subsections 601.08(2) and 601.09(2), a radiocommunication system adequate to permit two-way communication on the appropriate frequency when the aircraft is operated within
 - (i) Class B, Class C or Class D airspace,
 - (ii) an MF area, unless the aircraft is operated pursuant to subsection 602.97(3), or
 - (iii) the ADIZ;

- (l) where the aircraft is operated under Subpart 4 of this Part, or under Subpart 3, 4 or 5 of Part VII, radiocommunication equipment adequate to permit two-way communication on the appropriate frequency;
- (m) where the aircraft is operated in Class B airspace, radio navigation equipment that will enable it to be operated in accordance with a flight plan; and
- (n) where the aircraft is operated under Subpart 4 of this Part or under Subpart 5 of Part VII, radio navigation equipment that is adequate to receive radio signals from a transmitting facility.

Power-driven Aircraft - VFR OTT

605.15 (1) No person shall conduct a take-off in a power-driven aircraft for the purpose of VFR OTT flight unless it is equipped with

- (a) the equipment referred to in paragraphs 605.14(c) to (j);
- (b) a sensitive altimeter adjustable for barometric pressure;
- (c) a means of preventing malfunction caused by icing for each airspeed indicating system;
- (d) a gyroscopic direction indicator or a stabilized magnetic direction indicator;
- (e) an attitude indicator;
- (f) subject to subsection (2), a turn and slip indicator or turn coordinator;
- (g) where the aircraft is to be operated within the Northern Domestic Airspace, a means of establishing direction that is not dependent on a magnetic source;
- (h) radiocommunication equipment adequate to permit two-way communication on the appropriate frequency; and
- (i) radio navigation equipment adequate to permit the aircraft to be navigated safely.

(2) Where the aircraft is equipped with a ~~third~~ attitude indicator that is usable through flight attitudes of 360° of pitch and roll for an aeroplane, or $\pm 80^\circ$ of pitch and $\pm 120^\circ$ of roll for a helicopter, the aircraft may be equipped with a slip-skid indicator in lieu of a turn and slip indicator or a turn coordinator.

(amended 2006/06/30)

Power-driven Aircraft - Night VFR

605.16 (1) No person shall conduct a take-off in a power-driven aircraft for the purpose of night VFR flight, unless it is equipped with

- (a) the equipment referred to in paragraphs 605.14(c) to (n);
- (b) a sensitive altimeter adjustable for barometric pressure;
- (c) subject to subsection (2), a turn and slip indicator or turn coordinator;
- (d) an adequate source of electrical energy for all of the electrical and radio equipment;
- (e) in respect of every set of fuses of a particular rating that is installed on the aircraft and accessible to the pilot-in-command during flight, a number of spare fuses that is equal to at least 50 per cent of the total number of installed fuses of that rating;

- (f) where the aircraft is operated so that an aerodrome is not visible from the aircraft, a stabilized magnetic direction indicator or a gyroscopic direction indicator;
- (g) where the aircraft is to be operated within the Northern Domestic Airspace, a means of establishing direction that is not dependent on a magnetic source;
- (h) where the aircraft is an airship operated within controlled airspace, radar reflectors attached in such a manner as to be capable of a 360-degree reflection;
- (i) a means of illumination for all of the instruments used to operate the aircraft;
- (j) when carrying passengers, a landing light; and
- (k) position and anti-collision lights that conform to the *Aircraft Equipment and Maintenance Standards*.

(2) Where the aircraft is equipped with a ~~third~~ attitude indicator that is usable through flight attitudes of 360° of pitch and roll for an aeroplane, or $\pm 80^\circ$ of pitch and $\pm 120^\circ$ of roll for a helicopter, the aircraft may be equipped with a slip-skid indicator in lieu of a turn and slip indicator or a turn coordinator.

~~(amended 2006/06/30)~~

(3) No person shall operate an aircraft that is equipped with any light that may be mistaken for, or downgrade the conspicuity of, a light in the navigation light system, unless the aircraft is being operated for the purpose of aerial advertising.

(4) In addition to the equipment requirements specified in subsection (1), no person shall operate an aircraft in night VFR flight under Subpart 4 of this Part or Subparts 2 to 5 of Part VII, unless the aircraft is equipped with

- (a) an attitude indicator;
- (b) a vertical speed indicator;
- (c) a means of preventing malfunction caused by icing for each airspeed indicating system; and
- (d) an outside air temperature gauge.

Use of Position and Anti-collision Lights

605.17 (1) Subject to subsection (2), no person shall operate an aircraft in the air or on the ground at night, or on water between sunset and sunrise, unless the aircraft position lights and anti-collision lights are turned on.

(2) Anti-collision lights may be turned off where the pilot-in-command determines that, because of operating conditions, doing so would be in the interests of aviation safety.

Power-driven Aircraft - IFR

605.18 No person shall conduct a take-off in a power-driven aircraft for the purpose of IFR flight unless it is equipped with

- (a) when it is operated by day, the equipment required pursuant to paragraphs 605.16(1)(a) to (h);

- (b) when it is operated by night, the equipment required pursuant to paragraphs 605.16(1)(a) to (k);
- (c) an attitude indicator;
- (d) a vertical speed indicator;
- (e) an outside air temperature gauge;
- (f) a means of preventing malfunction caused by icing for each airspeed indicating system;
- (g) a power failure warning device or vacuum indicator that shows the power available to gyroscopic instruments from each power source;
- (h) an alternative source of static pressure for the altimeter, airspeed indicator and vertical speed indicator;
- (i) sufficient radiocommunication equipment to permit the pilot to conduct two-way communications on the appropriate frequency; and
- (j) sufficient radio navigation equipment to permit the pilot, in the event of the failure at any stage of the flight of any item of that equipment, including any associated flight instrument display,
 - (i) to proceed to the destination aerodrome or proceed to another aerodrome that is suitable for landing, and
 - (ii) where the aircraft is operated in IMC, to complete an instrument approach and, if necessary, conduct a missed approach procedure.

Balloons - Day VFR

605.19 No person shall conduct a take-off in a balloon for the purpose of day VFR flight unless it is equipped with

- (a) an altimeter;
- (b) a vertical speed indicator;
- (c) in the case of a hot air balloon,
 - (i) a fuel quantity gauge, and
 - (ii) an envelope temperature indicator;
- (d) in the case of a captive gas balloon, a magnetic direction indicator; and
- (e) subject to subsections 601.08(2) and 601.09(2), a radiocommunication system adequate to permit two-way communication on the appropriate frequency when the balloon is operated within
 - (i) Class C or Class D airspace,
 - (ii) an MF area, unless the aircraft is operated pursuant to subsection 602.97(3), or
 - (iii) the ADIZ.

Balloons - Night VFR

605.20 No person shall conduct a take-off in a balloon for the purpose of night VFR flight unless it is equipped with

- (a) equipment required pursuant to Section 605.19;
- (b) position lights;
- (c) a means of illuminating all of the instruments used by the flight crew, including a flashlight; and
- (d) in the case of a hot air balloon, two independent fuel systems.

Gliders - Day VFR

605.21 No person shall operate a glider in day VFR flight unless it is equipped with

- (a) an altimeter;
- (b) an airspeed indicator;
- (c) a magnetic compass or a magnetic direction indicator; and
- (d) subject to subsections 601.08(2) and 601.09(2), a radiocommunication system adequate to permit two-way communication on the appropriate frequency when the glider is operated within
 - (i) Class C or Class D airspace,
 - (ii) an MF area, unless the aircraft is operated pursuant to subsection 602.97(3), or
 - (iii) the ADIZ.

Seat and Safety Belt Requirements

605.22 (1) Subject to subsection 605.23, no person shall operate an aircraft other than a balloon unless it is equipped with a seat and safety belt for each person on board the aircraft other than an infant.

(2) Subsection (1) does not apply to a person operating an aircraft that was type-certificated with a safety belt designed for two persons.

(3) A safety belt referred to in subsection (1) shall include a latching device of the metal-to-metal type.

Restraint System Requirements

605.23 An aircraft may be operated without being equipped in accordance with Section 605.22 in respect of the following persons if a restraint system that is secured to the primary structure of the aircraft is provided for each person who is

- (a) carried on a stretcher or in an incubator or other similar device;
- (b) carried for the purpose of parachuting from the aircraft; or
- (c) required to work in the vicinity of an opening in the aircraft structure.

Shoulder Harness Requirements

605.24 (1) No person shall operate an aeroplane, other than a small aeroplane manufactured before July 18, 1978, unless each front seat or, if the aeroplane has a flight deck, each seat on the flight deck is equipped with a safety belt that includes a shoulder harness.

(2) Except as provided in Section 705.75, no person shall operate a transport category aeroplane unless each flight attendant seat is equipped with a safety belt that includes a shoulder harness.

(3) No person shall operate a small aeroplane manufactured after December 12, 1986, the initial type certificate of which provides for not more than nine passenger seats, excluding any pilot seats, unless each forward- or aft-facing seat is equipped with a safety belt that includes a shoulder harness.

(4) No person shall operate a helicopter manufactured after September 16, 1992, the initial type certificate of which specifies that the helicopter is certified as belonging to the normal or transport category, unless each seat is equipped with a safety belt that includes a shoulder harness.

(5) No person operating an aircraft shall conduct any of the following flight operations unless the aircraft is equipped with a seat and a safety belt that includes a shoulder harness for each person on board the aircraft:

- (a)** aerobatic manoeuvres;
- (b)** class B, C or D external load operations conducted by a helicopter; and
- (c)** aerial application, or aerial inspection other than flight inspection for the purpose of calibrating electronic navigation aids, conducted at altitudes below 500 feet AGL.

General Use of Safety Belts and Restraint Systems

605.25 (1) The pilot-in-command of an aircraft shall direct all of the persons on board the aircraft to fasten safety belts

- (a)** during movement of the aircraft on the surface;
- (b)** during take-off and landing; and
- (c)** at any time during flight that the pilot-in-command considers it necessary that safety belts be fastened.

(2) The directions referred to in subsection (1) also apply to the use of the following restraint systems:

- (a)** a child restraint system;
- (b)** a restraint system used by a person who is engaged in parachute descents; and
- (c)** a restraint system used by a person when working in the vicinity of an opening in the aircraft structure.

(3) Where an aircraft crew includes flight attendants and the pilot-in-command anticipates that the level of turbulence will exceed light turbulence, the pilot-in-command shall immediately direct each flight attendant to

- (a)** discontinue duties relating to service;

(b) secure the cabin; and

(c) occupy a seat and fasten the safety belt provided.

(4) Where an aircraft is experiencing turbulence and the in-charge flight attendant considers it necessary, the in-charge flight attendant shall

(a) direct all of the passengers to fasten their safety belts; and

(b) direct all flight attendants to discontinue duties relating to service, to secure the cabin, to occupy the assigned seats and to fasten the safety belts provided and to do so oneself.
(amended 2006/06/30)

(5) Where the in-charge flight attendant has given directions in accordance with subsection (4), the in-charge flight attendant shall so inform the pilot-in-command.

Use of Passenger Safety Belts and Restraint Systems

605.26 (1) Where the pilot-in-command or the in-charge flight attendant directs that safety belts be fastened, every passenger who is not an infant shall

(a) ensure that the passenger's safety belt or restraint system is properly adjusted and securely fastened;

(b) if responsible for an infant for which no child restraint system is provided, hold the infant securely in the passenger's arms; and

(c) if responsible for a person who is using a child restraint system, ensure that the person is properly secured.

(2) No passenger shall be responsible for more than one infant.

Use of Crew Member Safety Belts

605.27 (1) Subject to subsection (2), the crew members on an aircraft shall be seated at their stations with their safety belts fastened

(a) during take-off and landing;

(b) at any time that the pilot-in-command directs; and

(c) in the case of crew members who are flight attendants, at any time that the in-charge flight attendant so directs pursuant to paragraph 605.25(4)(b).

(2) Where the pilot-in-command directs that safety belts be fastened by illuminating the safety belt sign, a crew member is not required to comply with paragraph (1)(b)

(a) during movement of the aircraft on the surface or during flight, if the crew member is performing duties relating to the safety of the aircraft or of the passengers on board;

(b) where the aircraft is experiencing light turbulence, if the crew member is a flight attendant and is performing duties relating to the passengers on board; or

(c) if the crew member is occupying a crew rest facility during cruise flight and the restraint system for that facility is properly adjusted and securely fastened.

(3) The pilot-in-command shall ensure that at least one pilot is seated at the flight controls with safety belt fastened during flight time.

Child Restraint System

605.28 (1) No operator of an aircraft shall permit the use of a child restraint system on board the aircraft unless

- (a) the person using the child restraint system is accompanied by a parent or guardian who will attend to the safety of the person during the flight;
- (b) the weight and height of the person using the child restraint system are within the range specified by the manufacturer;
- (c) the child restraint system bears a legible label indicating the applicable design standards and date of manufacture;
- (d) the child restraint system is properly secured by the safety belt of a forward-facing seat that is not located in an emergency exit row and does not block access to an aisle; and
- (e) the tether strap is used according to the manufacturer's instructions or, where subsection (2) applies, secured so as not to pose a hazard to the person using the child restraint system or to any other person.

(2) Where a seat incorporates design features to reduce occupant loads, such as the crushing or separation of certain components, and the seat is in compliance with the applicable design standards, no person shall use the tether strap on the child restraint system to secure the system.

(3) Every passenger who is responsible for a person who is using a child restraint system on board an aircraft shall be

- (a) seated in a seat adjacent to the seat to which the child restraint system is secured;
- (b) familiar with the manufacturer's installation instructions for the child restraint system; and
- (c) familiar with the method of securing the person in the child restraint system and of releasing the person from it.

Flight Control Locks

605.29 No operator of an aircraft shall permit the use of a flight control lock in respect of the aircraft unless

- (a) the flight control lock is incapable of becoming engaged when the aircraft is being operated; and
- (b) an unmistakable warning is provided to the person operating the aircraft whenever the flight control lock is engaged.

De-icing or Anti-icing Equipment

605.30 No person shall conduct a take-off or continue a flight in an aircraft where icing conditions are reported to exist or are forecast to be encountered along the route of flight unless

- (a) the pilot-in-command determines that the aircraft is adequately equipped to operate in icing conditions in accordance with the standards of airworthiness under which the type certificate for that aircraft was issued; or

(b) current weather reports or pilot reports indicate that icing conditions no longer exist.

Oxygen Equipment and Supply

605.31 (1) No person shall operate an unpressurized aircraft unless it is equipped with sufficient oxygen dispensing units and oxygen supply to comply with the requirements set out in the table to this subsection.

Table - Oxygen Requirements for Unpressurized Aircraft

Item	COLUMN I	COLUMN II
	Persons for Whom Oxygen Supply Must Be Available	Period of Flight and Cabin-Pressure-Altitude
1.	All crew members and 10 per cent of passengers and, in any case, no less than one passenger	Entire period of flight exceeding 30 minutes at cabin-pressure-altitudes above 10,000 feet ASL but not exceeding 13,000 feet ASL
2.	All persons on board the aircraft	<p>(a) Entire period of flight at cabin-pressure-altitudes above 13,000 feet ASL</p> <p>(b) For aircraft operated in an air transport service under the conditions referred to in paragraph (a), a period of flight of not less than one hour.</p>

(2) No person shall operate a pressurized aircraft unless it is equipped with sufficient oxygen dispensing units and oxygen supply to provide, in the event of cabin pressurization failure at the most critical point during the flight, sufficient oxygen to continue the flight to an aerodrome suitable for landing while complying with the requirements of the table to this subsection.

Table - Minimum Oxygen Requirements for Pressurized Aircraft Following Emergency Descent (Note 1)

Item	COLUMN I	COLUMN II
	Persons for Whom Oxygen Supply Must Be Available	Period of Flight and Cabin-Pressure-Altitude
1.	All crew members and 10 per cent of passengers and, in any case, no less than one passenger	<p>(a) Entire period of flight exceeding 30 minutes at cabin-pressure-altitudes above 10,000 feet ASL but not exceeding 13,000 feet ASL</p> <p>(b) Entire period of flight at cabin-pressure-altitudes above 13,000 feet ASL</p> <p>(c) For aircraft operated in an air transport service under the conditions referred to in paragraph (a) or (b), a period of flight of</p>

Item	COLUMN I	COLUMN II
	Persons for Whom Oxygen Supply Must Be Available	Period of Flight and Cabin-Pressure-Altitude
		not less than (i) 30 minutes (Note 2), and (ii) for flight crew members, two hours for aircraft the type certificate of which authorizes flight at altitudes exceeding FL 250 (Note 3)
2.	All passengers	(a) Entire period of flight at cabin-pressure-altitudes exceeding 13,000 feet ASL (b) For aircraft operated in an air transport service under the conditions referred to in paragraph (a), a period of flight of not less than 10 minutes.

NOTE 1: In determining the available supply, the cabin pressure altitude descent profile for the routes concerned must be taken into account.

NOTE 2: The minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aircraft's maximum operating altitude authorized in the type certificate to 10,000 feet ASL in 10 minutes, followed by 20 minutes at 10,000 feet ASL.

NOTE 3: The minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aircraft's maximum operating altitude authorized in the type certificate to 10,000 feet ASL in 10 minutes, followed by 110 minutes at 10,000 feet ASL.

Use of Oxygen

605.32 (1) Where an aircraft is operated at cabin-pressure-altitudes above 10,000 feet ASL but not exceeding 13,000 feet ASL, each crew member shall wear an oxygen mask and use supplemental oxygen for any part of the flight at those altitudes that is more than 30 minutes in duration.

(2) Where an aircraft is operated at cabin-pressure-altitudes above 13,000 feet ASL, each person on board the aircraft shall wear an oxygen mask and use supplemental oxygen for the duration of the flight at those altitudes.

(3) The pilot at the flight controls of an aircraft shall use an oxygen mask if

(a) the aircraft is not equipped with quick-donning oxygen masks and is operated at or above flight level 250; or

(b) the aircraft is equipped with quick-donning oxygen masks and is operated above flight level 410.

Flight Data Recorder and Cockpit Voice Recorder
(amended 2003/09/01)

605.33 (1) Subject to Section 605.34, no person shall conduct a take-off in any of the following multi-engined turbine-powered aircraft unless the aircraft is equipped with a flight data recorder that conforms to section 551.100 of Chapter 551 of the *Airworthiness Manual* and section 625.33 of Standard 625 — *Aircraft Equipment and Maintenance* of the *General Operating and Flight Rules Standards*:
(amended 2003/09/01)

(a) an aircraft in respect of which a type certificate has been issued authorizing the transport of 30 or fewer passengers, configured for 10 or more passenger seats and manufactured after October 11, 1991;
(amended 2003/09/01)

(b) an aeroplane in respect of which a type certificate has been issued authorizing the transport of 30 or fewer passengers and configured for 20 to 30 passenger seats;
(amended 2003/09/01)

(c) an aircraft in respect of which a type certificate has been issued authorizing the transport of more than 30 passengers; and
(amended 2003/09/01)

(d) an aircraft in respect of which a type certificate has been issued authorizing the transport of cargo only and operated under Subpart 5 of Part VII.
(amended 2003/09/01)

(2) Subject to section 605.34, no person shall conduct a take-off in a multi-engined turbine-powered aircraft that is configured for six or more passenger seats and for which two pilots are required by the aircraft type certificate or by the subpart under which the aircraft is operated, unless the aircraft is equipped with a cockpit voice recorder that conforms to section 551.101 of Chapter 551 of the *Airworthiness Manual* and section 625.33 of Standard 625 — *Aircraft Equipment and Maintenance* of the *General Operating and Flight Rules Standards*.
(amended 2003/09/01)

Use of Flight Data Recorders and Cockpit Voice Recorders

605.34 (1) Except where otherwise permitted in this Section, no person shall operate an aircraft for which a flight data recorder or cockpit voice recorder is required by these Regulations unless

(a) in the case where a flight data recorder is required, the flight data recorder is operated continuously from the start of the take-off until the completion of the landing; and

(b) in the case where a cockpit voice recorder is required, the cockpit voice recorder is operated continuously from the time at which electrical power is first provided to the recorder before the flight to the time at which electrical power is removed from the recorder after the flight.

(2) No person shall erase any communications pertaining to the flight being undertaken that have been recorded by a cockpit voice recorder.

(3) Where a minimum equipment list has been approved by the Minister in respect of the operator of an aircraft pursuant to subsection 605.07(3), the operator may operate the aircraft without a serviceable flight data recorder or cockpit voice recorder if the aircraft is operated in accordance with the minimum equipment list.

(4) Where a minimum equipment list has not been approved by the Minister in respect of the operator of an aircraft, the operator may operate the aircraft without a serviceable flight data recorder for a maximum period of 90 days after the date of failure of the flight data recorder if

(a) where a cockpit voice recorder is required by these Regulations, the cockpit voice recorder is serviceable; and

(b) the aircraft technical records show the date of the failure of the flight data recorder.

(5) Where a minimum equipment list has not been approved by the Minister in respect of the operator of an aircraft, the operator may operate the aircraft without a serviceable cockpit voice recorder for a maximum period of 90 days after the date of failure of the cockpit voice recorder if

(a) where a flight data recorder is required by these Regulations, the flight data recorder is serviceable; and

(b) the aircraft technical records show the date of the failure of the cockpit voice recorder.

Transponder and Automatic Pressure-Altitude Reporting Equipment

605.35 (1) Subject to subsections (2) and (3), no person shall operate an aircraft, other than a balloon or a glider, in **transponder airspace**, unless the aircraft is equipped with a transponder and automatic pressure-altitude reporting equipment.
(amended 2006/06/30)

(2) The aircraft referred to in subsection (1) may be operated without a serviceable transponder and automatic pressure-altitude reporting equipment if

(a) where a minimum equipment list has been approved by the Minister in respect of the operator of the aircraft pursuant to subsection 605.07(3), the aircraft is operated in accordance with the minimum equipment list; or

(b) where a minimum equipment list has not been approved by the Minister in respect of the operator of the aircraft, the aircraft is operated

(i) to the next aerodrome of intended landing, and

(ii) thereafter, in accordance with an air traffic control clearance, to complete a planned flight schedule or to proceed to a maintenance facility.

(3) An air traffic control unit may authorize a person to operate an aircraft that is not equipped in accordance with subsection (1) within airspace referred to in Section 601.03 where

(a) the air traffic control unit provides an air traffic control service in respect of that airspace;

- (b) the air traffic control unit received a request from the person to operate the aircraft within that airspace before the aircraft entered the airspace; and
- (c) aviation safety is not likely to be affected.

Altitude Alerting System or Device

605.36 (1) Subject to subsection (2), no person shall conduct a take-off in a turbo-jet-powered aeroplane unless it is equipped with an altitude alerting system or device that conforms to the *Aircraft Equipment and Maintenance Standards*.

(2) An aeroplane referred to in subsection (1) may be operated without a serviceable altitude alerting system or device if

- (a) where a minimum equipment list has been approved by the Minister in respect of the operator of the aeroplane pursuant to subsection 605.07(3), the aeroplane is operated in accordance with the minimum equipment list; or
- (b) where a minimum equipment list has not been approved by the Minister in respect of the operator of the aeroplane, the aeroplane is operated
 - (i) from the place where the operator or pilot-in-command takes possession of the aeroplane to a place where the aeroplane can be equipped with such a system or device,
 - (ii) for the sole purpose of conducting a flight test, a pilot proficiency check or flight crew member training, or
 - (iii) where the system or device becomes unserviceable after take-off, until it reaches an aerodrome at which the system or device can be repaired or replaced.

Ground Proximity Warning System

605.37 (1) Subject to subsections (2) and (3), no person operating under Subpart 4 or 5 of Part VII shall conduct a take-off in a turbo-jet-powered aeroplane that has a MCTOW of more than 15 000 kg (33,069 pounds) and for which a type certificate has been issued authorizing the transport of 10 or more passengers, unless the aeroplane is equipped with a ground proximity warning system.

(2) An aeroplane referred to in subsection (1) may be operated without a serviceable ground proximity warning system if a minimum equipment list has been approved by the Minister in respect of the operator of the aeroplane pursuant to subsection 605.07(3) and the aeroplane is operated in accordance with the minimum equipment list.

(3) Where, in the interests of aviation safety, it is necessary during a flight to deactivate any mode of a ground proximity warning system, the pilot-in-command of the aeroplane may deactivate that mode if the deactivation is performed in accordance with the aircraft flight manual, aircraft operating manual, flight manual supplement or minimum equipment list.

ELT

605.38 (1) Subject to subsection (3), no person shall operate an aircraft unless it is equipped with one or more ELTs in accordance with subsection (2).

(2) An aircraft set out in column I of an item of the table to this subsection shall, for the area of operation set out in column II of the item, be equipped with the quantity and type of

ELTs referred to in column III of that item, which ELTs shall be armed, if so specified in the aircraft flight manual, aircraft operating manual, pilot operating handbook or equivalent document provided by the manufacturer.

Table

ELT Requirements

Item	COLUMN I	COLUMN II	COLUMN III
	Aircraft	Area of Operation	Minimum Equipment
1.	All aircraft except those referred to in subsection (3)	Over land	One ELT of Type AD, AF, AP, A or F
2.	Large multi-engined turbo-jet aeroplanes engaged in an air transport service carrying passengers	Over water at a distance from land that requires the carriage of life rafts pursuant to section 602.63	Two ELTs of Type W or S or one of each
3.	All aircraft that require an ELT other than those set out in item 2	Over water at a distance from land that requires the carriage of life rafts pursuant to section 602.63	One ELT of Type W or S

(3) An aircraft referred to in subsection (1) may be operated without an ELT on board where the aircraft is

(a) a glider, balloon, airship, ultra-light aeroplane or gyroplane;

(b) Repealed

(amended 2004/09/01)

(c) registered under the laws of a contracting state or a state that is a party to an agreement entered into with Canada relating to interstate flying, and is equipped with a serviceable radio transmitter that

(i) is approved by the state of registry for search and rescue purposes, and

(ii) has a distinctive audio signal and is capable of communication on the frequency of 121.5 MHz, or simultaneously on the frequencies of 121.5 MHz and 243.0 MHz;

(d) operated by the holder of a flight training unit operating certificate, engaged in flight training and operated within 25 nautical miles of the aerodrome of departure;

(e) engaged in a flight test;

(f) a new aircraft engaged in flight operations incidental to manufacture, preparation or delivery of the aircraft;

(g) operated for the purpose of permitting a person to conduct a parachute descent within 25 nautical miles of the aerodrome of departure; or

(amended 2002/09/24)

(h) operated in accordance with Section 605.39.

(amended 2002/09/24)

(4) If an aircraft is equipped with one or more ELTs capable of broadcasting on the frequency of 406 MHz, each ELT shall be registered with
(amended 2002/09/24)

(a) the Canadian Beacon Registry of the National Search and Rescue Secretariat; or
(amended 2002/09/24)

(b) the appropriate authority of the country identified in the coded message transmitted by the ELT.

(amended 2002/09/24)

Use of ELTs

605.39 (1) An aircraft that is required to be equipped with one or more ELTs under section 605.38 may be operated without a serviceable ELT if the operator
(amended 2002/09/24)

(a) repairs the ELT or removes it from the aircraft at the first aerodrome at which repairs or removal can be accomplished;

(amended 2002/09/24)

(b) on removal of the ELT, sends the ELT to a maintenance facility; and

(amended 2002/09/24)

(c) displays on a readily visible placard within the aircraft cockpit, until the ELT is replaced, a notice stating that the ELT has been removed and setting out the date of its removal.

(amended 2002/09/24)

(2) If an aircraft is required to have one ELT under section 605.38, the operator shall re-equip the aircraft with a serviceable ELT within
(amended 2002/09/24)

(a) 10 days after the date of removal, if the aircraft is operated under Subpart 4 or 5 of Part VII, or

(amended 2002/09/24)

(b) 30 days after the date of removal in the case of any other aircraft.

(amended 2002/09/24)

(3) If an aircraft is required to have two ELTs under section 605.38, the operator shall
(amended 2002/09/24)

(a) if one of the ELTs is unserviceable, repair or replace it within 10 days after the date of removal; and

(amended 2002/09/24)

(b) if both ELTs are unserviceable, repair or replace

(amended 2002/09/24)

(i) one ELT at the first aerodrome at which a repair or replacement can be accomplished, and

(amended 2002/09/24)

- (ii) the second ELT within 10 days after the date of removal.
(amended 2002/09/24)

ELT Activation

605.40 (1) Subject to subsection (2), no person shall activate an ELT except in an emergency.

(2) A person may activate an ELT during the first five minutes of any hour UTC for a duration of not more than five seconds for the purpose of testing it.
(amended 2002/09/24)

(3) Where an ELT has been inadvertently activated during flight, the pilot-in-command of the aircraft shall ensure that

- (a) the nearest air traffic control unit, flight service station or community aerodrome radio station is so informed as soon as possible; and
(b) the ELT is switched off.

Third Attitude Indicator

(amended 2006/06/30)

605.41 (1) No person shall conduct a take-off in a turbo-jet-powered aeroplane that is operated under Part VII without a third attitude indicator that meets the requirements of section 625.41 of the *Aircraft Equipment and Maintenance Standards* unless the aeroplane
(amended 2006/06/30)

(a) has a MCTOW of less than 5 700 kg (12,566 pounds); and
(amended 2006/06/30)

(b) was operated in Canada in a commercial air service on October 10, 1996.
(amended 2006/06/30)

(2) No person shall conduct a take-off in a transport category aircraft without a third attitude indicator that meets the requirements of section 625.41 of the *Aircraft Equipment and Maintenance Standards* unless the aircraft
(amended 2006/06/30)

(a) is a transport category helicopter not operated in IFR flight;
(amended 2006/06/30)

(b) is a transport category aeroplane powered by reciprocating engines that was manufactured before January 1, 1998; or
(amended 2006/06/30)

(c) is not operated pursuant to Part VII.
(amended 2006/06/30)

(3) No person shall conduct a take-off in a turbo-propeller powered aeroplane that is operated under Part VII without a third attitude indicator that meets the requirements of section 625.41 of the *Aircraft Equipment and Maintenance Standards* unless the aeroplane
(amended 2006/06/30)

(a) has a passenger seating configuration, excluding pilot seats, of 30 or fewer;
(amended 2006/06/30)

(b) has a payload capacity of 3 402 kg (7,500 pounds) or less; and
(amended 2006/06/30)

(c) was manufactured prior to March 20, 1997.
(amended 2006/06/30)

(4) After December 20, 2010, no person shall conduct a take-off in a turbo-propeller powered aeroplane having a passenger seating configuration, excluding pilot seats, of 10 or more, and operated under Part VII, unless the aeroplane is equipped with a third attitude indicator that meets the requirements of section 625.41 of the *Aircraft Equipment and Maintenance Standards*.
(amended 2006/06/30)

Reserved

605.42 to 605.83

DIVISION III - AIRCRAFT MAINTENANCE REQUIREMENTS

Aircraft Maintenance - General

605.84 (1) Subject to subsections (3) and (4), no person shall conduct a take-off or permit a take-off to be conducted in an aircraft that is in the legal custody and control of the person, other than an aircraft operated under a special certificate of airworthiness in the owner-maintenance or amateur-built classification, unless the aircraft
(amended 2002/03/01)

(a) is maintained in accordance with any airworthiness limitations applicable to the aircraft type design;
(amended 2002/03/01)

(b) meets the requirements of any airworthiness directive issued under section 521.427; and
(amended 2009/12/01)

(c) except as provided in subsection (2), meets the requirements of any notices that are equivalent to airworthiness directives and that are issued by
(amended 2002/03/01)

(i) the competent authority of the foreign state that, at the time the notice was issued, is responsible for the type certification of the aircraft, engine, propeller or appliance, or

(ii) for an aeronautical product in respect of which no type certificate has been issued, the competent authority of the foreign state that manufactured the aeronautical product.

(2) In the case of a conflict between an airworthiness directive issued by the Minister under section 521.427 and a foreign notice, the airworthiness directive prevails.
(amended 2009/12/01)

(3) The Minister shall exempt the owner of a Canadian aircraft from the requirement to comply with all or part of an airworthiness directive, subject to appropriate conditions relating to aviation safety, as specified in Appendix H of the *Aircraft Equipment and Maintenance Standards*, where the owner demonstrates to the Minister that

(a) under circumstances specified in the exemption request, compliance is impractical or unnecessary; and

(b) the exemption will provide a level of safety that is equivalent to that required by the airworthiness directive.

(4) The Minister shall approve an alternative means of compliance with an airworthiness directive, for reasons set out in the approval, where the Minister is satisfied that the proposed alternative will maintain the level of safety that is provided for by the compliance time, the modification, the restriction, the replacement, the special inspection or the procedure set out in the airworthiness directive.

Maintenance Release and Elementary Work

605.85 (1) Subject to subsections (2) and (3), no person shall conduct a take-off in an aircraft, or permit a take-off to be conducted in an aircraft that is in the legal custody and control of the person, where that aircraft has undergone maintenance, unless the maintenance has been certified by the signing of a maintenance release pursuant to section 571.10.

(2) Where a maintenance release is conditional on the satisfactory completion of a test flight pursuant to subsection 571.10(4), the aircraft may be operated for the purpose of the test flight if no person is carried on board other than flight crew members and persons necessary for the purpose of making observations that are essential to the test flight.

(3) Following a test flight conducted pursuant to subsection (2), the pilot-in-command shall enter the results of the test flight in the journey log and, where the entry indicates that the results of the test flight are satisfactory, that entry completes the maintenance release required by subsection (1).

(4) No maintenance release is required in respect of tasks identified as elementary work in the *Aircraft Equipment and Maintenance Standards*.

Maintenance Schedule

605.86 (1) Subject to subsection (3), no person shall conduct a take-off in an aircraft, or permit a take-off to be conducted in an aircraft that is in the person's legal custody and control, unless the aircraft is maintained in accordance with

(a) a maintenance schedule that conforms to the *Aircraft Equipment and Maintenance Standards*; and

(b) where the aircraft is operated under Subpart 6 of Part IV or under Part VII, or is a large aircraft, a turbine-powered pressurized aircraft or an airship, a maintenance schedule approved by the Minister in respect of the aircraft operator pursuant to subsection (2).

(2) The Minister shall approve a maintenance schedule in respect of an aircraft if the schedule conforms to the *Aircraft Equipment and Maintenance Standards*.

(3) The Minister shall authorize an operator to deviate from the requirements of the applicable maintenance schedule where the operator

(a) submits a request in writing to the Minister in accordance with the *Aircraft Equipment and Maintenance Standards*; and

(b) demonstrates that the deviation will not affect aviation safety.

Transfer of Aeronautical Products between Maintenance Schedules

605.87 No aeronautical product shall be maintained in accordance with a maintenance schedule that is different from the one under which it was previously maintained unless

- (a) the aeronautical product has been subjected to an inspection that establishes it on the new maintenance schedule; and
- (b) the times remaining until each action on the new maintenance schedule is to be taken have been established in accordance with the *Aircraft Equipment and Maintenance Standards*.

Inspection after Abnormal Occurrences

605.88 (1) No person shall conduct a take-off in an aircraft that has been subjected to any abnormal occurrence unless the aircraft has been inspected for damage in accordance with Appendix G of the *Aircraft Equipment and Maintenance Standards*.

(2) Where the inspection referred to in subsection (1) does not involve disassembly, it may be performed by the pilot-in-command.

Reserved

605.89 to 605.91

DIVISION IV - TECHNICAL RECORDS***Requirement to Keep Technical Records***

605.92 (1) Every owner of an aircraft shall keep the following technical records in respect of the aircraft:

- (a) a journey log;
- (b) subject to subsections (2) and (3), a separate technical record for the airframe, each installed engine and each variable-pitch propeller; and
- (c) except where otherwise provided under the terms of a fleet empty weight and balance program referred to in subsection 706.06(3), an empty weight and balance report that meets the applicable standards set out in Chapter 571 of the *Airworthiness Manual*.

(2) The technical records required by paragraph (1)(b) may consist of separate technical records for each component installed in the airframe, engine or propeller.

(3) In the case of a balloon or a glider, or an aircraft operated under a special certificate of airworthiness in the owner-maintenance or amateur-built classification, all entries in respect of the technical records referred to in paragraphs (1)(b) and (c) may be kept in the journey log.
(amended 2002/03/01)

Technical Records - General

605.93 (1) Every person who makes an entry in a technical record shall

- (a) make the entry accurately, legibly and in a permanent manner;
- (b) enter the person's name and signature or employee identifier or, where the record is kept as electronic data, enter the person's user code or an equivalent security designation; and

(c) date the entry.

(2) Where the owner of an aircraft keeps the technical records for the aircraft as electronic data, the owner shall ensure that the electronic data system that is used complies with Section 103.04 and the *Aircraft Equipment and Maintenance Standards*.

(3) The owner of an aircraft shall ensure that all of the necessary measures are taken to protect the technical records for the aircraft from damage and loss.

(4) Every person who brings into use a new volume of an existing technical record shall make the entries relating to the preceding volume that are necessary to ensure that an unbroken chronological record is maintained.

(5) Subject to subsection (6), where a person alters an entry on a technical record for the purpose of correcting the entry, the person shall do so by striking out the incorrect entry in such a manner that the underlying information remains legible, and inserting the correct entry together with

(a) the date of the alteration;

(b) the reason for the alteration, if it is necessary to clarify why the alteration was made; and

(c) the person's name and signature or employee identifier or, where the record is kept as electronic data, the person's user code or equivalent security designation.

(6) Where a correction referred to in subsection (5) is being made to a technical record that is maintained as electronic data, the correction shall be made in a manner that does not render the original data inaccessible.

Journey Log Requirements

605.94 (1) The particulars set out in column I of an item in Schedule I to this Division shall be recorded in the journey log at the time set out in column II of the item and by the person responsible for making entries set out in column III of that item.

(2) No person shall make a single entry in a journey log in respect of a series of flights unless

(a) the aircraft is operated by the same pilot-in-command throughout the series; or

(b) a daily flight record is used pursuant to Section 406.56.

(3) The owner of an aircraft shall retain every entry in a journey log for a period of not less than one year.
(amended 2006/06/30)

(4) Unless recorded in the operational flight plan or operational flight data sheet, the pilot-in-command of an aircraft engaged in a commercial air service and operating in international flight shall record in the journey log the following particulars in respect of each flight:

(a) the names of all of the crew members and their duty assignments;

(b) the places and times of departure and arrival;

(c) the flight time;

(d) the nature of the flight, such as private, aerial work, scheduled or non-scheduled; and

(e) any incidents or observations relating to the flight.

Journey Log - Carrying on Board

605.95 (1) Subject to subsection (2), no person shall conduct a take-off in an aircraft unless the journey log is on board the aircraft.

(2) A person may conduct a take-off in an aircraft without carrying the journey log on board where

(a) it is not planned that the aircraft will land and shut down at any location other than the point of departure; or

(b) the aircraft is a balloon and the journey log is immediately available to the pilot-in-command

(i) prior to commencing a flight, and

(ii) on completion of the flight.

Requirements for Technical Records Other Than the Journey Log

605.96 (1) The particulars set out in column I of an item in Schedule II to this Division shall be recorded in the appropriate technical record at the time set out in column II of the item and by the person responsible for making entries set out in column III of that item.

(2) Where particulars of any maintenance performed on an aircraft are transferred from the journey log at the time set out in column II of item 4 of Schedule II to this Division, the person responsible for the entry shall

(a) transcribe the particulars and include the name and identification number of the person who made the original entry; or

(b) where the pages of the journey log have detachable copies, attach the copy of the page containing these particulars to the applicable technical record.

(3) Where a component is installed on a higher assembly, the technical record for that component shall become a part of the technical record for the higher assembly.

(4) Except in the case of the journey log, the owner of an aircraft shall retain each technical record for the applicable period set out in the *Aircraft Equipment and Maintenance Standards*.

Transfer of Records

605.97 Every owner of an aircraft who transfers title of an aircraft, airframe, engine, propeller or appliance to another person shall, at the time of transfer, also deliver to that person all of the technical records that relate to that aeronautical product.

Reserved

605.98 to 605.110

Schedule I - Journey Log

(Subsection 605.94(1) and Item 3 of Schedule II)
(amended 2006/06/30)

Item	COLUMN I	COLUMN II	COLUMN III
	Particulars to be entered	Time of entry	Person responsible for entry
1.	Aircraft nationality and registration marks Aircraft manufacturer, type, model and serial number	On starting to keep a journey log and on bringing a new volume of an existing log into use	The owner of the aircraft
2.	Except where an approved fleet empty weight and balance control program is in place, aircraft empty weight and empty centre of gravity and any change in the aircraft empty weight and empty centre of gravity	On starting to keep a journey log and on bringing a new volume of an existing log into use and, when a change is made, as soon as practicable after the change but, at the latest, before the next flight	The owner of the aircraft and, for any change, the person who made the change
3.	Where an additional flight authority has been issued in respect of an aircraft under section 507.08, any change in the flight authority in effect	On changing the flight authority in effect	The person who made the change
4.	Air time of each flight or series of flights and cumulative total air time and, where applicable, number of operating cycles or landings since date of manufacture	Daily, on completing each flight or series of flights	The pilot-in-command of the aircraft or a person designated by an air operator, a private operator or a flight training unit
5.	Except where an equivalent technical dispatch procedure is in place in accordance with section 706.06, (a) a description of the applicable maintenance	On bringing the maintenance schedule into use and on completing each scheduled maintenance action referred to in column I of this item	The owner of the aircraft

Item	COLUMN I Particulars to be entered	COLUMN II Time of entry	COLUMN III Person responsible for entry
	schedule; and (b) the date, air time, operating cycle or landing at which the next scheduled maintenance action is required		
6.	Particulars of any abnormal occurrence to which the aircraft has been subjected	As soon as practicable after the abnormal occurrence but, at the latest, before the next flight	The pilot-in-command of the aircraft or, where the abnormal occurrence took place during maintenance, the operator of the aircraft at the time of the occurrence
7.	Particulars relating to a conditional maintenance release signed in accordance with section 571.10	As soon as practicable after the aircraft has received a conditional maintenance release for a test flight but, at the latest, prior to that test flight	The person who signed the conditional maintenance release
8.	Particulars relating to the results of a test flight entered pursuant to subsection 605.85(3)	On completing the test flight but, at the latest, before the next flight	The pilot-in-command of the aircraft who conducted the test flight
9.	Particulars of any defect in any part of the aircraft or its equipment that becomes apparent during flight operations	As soon as practicable after the defect is discovered but, at the latest, before the next flight	The pilot-in-command of the aircraft
10.	Except where an equivalent technical dispatch procedure is in place in accordance with section 706.06, the particulars of any defect in any part of the aircraft or its equipment that is not rectified before the next flight	Before the next flight	The person who discovered the defect

Item	COLUMN I	COLUMN II	COLUMN III
	Particulars to be entered	Time of entry	Person responsible for entry
II	Particulars of any maintenance action or elementary work performed in respect of items 2, 6, 9 and 10	As soon as practicable after the maintenance action or elementary work is performed but, at the latest, before the next flight	The person who performed the maintenance action or elementary work and, where applicable, the person signing the maintenance release

Schedule II - Technical Record for an Airframe, Engine, Propeller or Component

(Subsections 605.96(1) and (2))

(amended 2006/06/30)

Item	COLUMN I	COLUMN II	COLUMN III
	Particulars to be entered	Time of entry	Person responsible for entry
1.	<p>Aircraft manufacturer, type, model designation and serial number and, in the case of an airframe, aircraft nationality and registration marks</p> <p>In the case of an engine, propeller or component, the identification number of the aircraft or higher assembly on which the aeronautical product is, or has been, installed</p> <p>Any features of the configuration of the airframe, engine, propeller or component that would affect its use or its suitability for installation on a higher assembly</p>	<p>On starting to keep a technical record and on bringing a new volume of an existing record into use, after any change in the data on the manufacturer's data plate or following the installation or removal of an engine, propeller or component</p>	<p>The owner of the aircraft</p>
2.	<p>The details outlining the scheduling provisions of any airworthiness directive applicable to the airframe, engine, propeller or component, or to any airframe, engine, propeller or component of the same type, and any part thereof</p>	<p>On the coming into effect of the airworthiness directive</p>	<p>The owner of the aircraft</p>
3.	<p>The particulars of any abnormal occurrence to which the airframe, engine, propeller or component has been subjected and that has</p>	<p>No later than 30 days after the abnormal occurrence</p>	<p>The owner of the aircraft</p>

Item	COLUMN I	COLUMN II	COLUMN III
	Particulars to be entered	Time of entry	Person responsible for entry
	been recorded in the journey log pursuant to item 6 of Schedule I		
4.	The particulars of any maintenance performed, including the particulars of any maintenance performed in order to comply with the requirements of an airworthiness directive	As soon as practicable after the maintenance action is performed but, at the latest, before the next flight or, in the case of particulars transferred from the journey log, no later than 30 days after the maintenance action is performed	The person who performed the maintenance action or, in a case where particulars are transferred from the journey log, the owner of the aircraft
5.	Total air time and, where applicable, the number of operating cycles or landings since date of manufacture, at the time of each abnormal occurrence or maintenance action recorded pursuant to item 3 or 4	No later than 30 days after the abnormal occurrence or maintenance action	The person responsible for the entry pursuant to item 3 or 4



Transport Canada
Safety and Security

Transports Canada
Sécurité et sûreté

CARs

CANADIAN AVIATION REGULATIONS

***PART VI-
SUBPART 6 - MISCELLANEOUS***

606



Canada

CANADIAN AVIATION REGULATIONS

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CANADIAN AVIATION REGULATIONS

SUBPART 6 - MISCELLANEOUS

Munitions of War

606.01 No person shall carry weapons, ammunition or other equipment designed for use in war on board an aircraft unless the aircraft is a Canadian aircraft or the Minister has authorized the carriage of such equipment.

Liability Insurance

606.02 (1) This section applies to every owner of an aircraft that is registered in Canada, or registered pursuant to the laws of a foreign state and operated in Canada, who is not required to subscribe for liability insurance in respect of the aircraft pursuant to section 7 of the *Air Transportation Regulations*.

(2) Subject to subsection (3), none of the following aircraft owners shall operate an aircraft unless, in respect of every incident related to the operation of the aircraft, the owner has subscribed for liability insurance covering risks of injury to or death of passengers in an amount that is not less than the amount determined by multiplying \$300,000 by the number of passengers on board the aircraft:

- (a) an air operator;
- (b) the holder of a flight training unit operator certificate; or
- (c) the operator of a balloon in which fare-paying passengers are carried on board pursuant to Subpart 3.

(3) The insurance coverage referred to in subsection (2) need not extend to any passenger who

(a) is an employee of an owner referred to in paragraph (2)(a), (b) or (c), if workers' compensation legislation governing a claim for damages against the owner by the employee is applicable; or

(b) is carried on board the aircraft for the purpose of conducting a parachute descent, where the air operator has posted a readily visible notice to inform passengers, before embarking, that there is no insurance coverage for parachutists.

(4) No aircraft owner not referred to in paragraph (2)(a), (b) or (c) shall operate an aircraft of more than 2 268 kg (5,000 pounds) maximum permissible take-off weight unless the owner has, in respect of the aircraft, subscribed for liability insurance covering risks of injury to or death of passengers, other than passengers carried on board that aircraft for the purpose of conducting a parachute descent, in an amount not less than the amount determined by multiplying \$300,000 by the number of passengers on board the aircraft.

(5) No aircraft owner referred to in paragraph (2)(a), (b) or (c) shall operate an aircraft unless, in respect of every incident related to the operation of the aircraft, the owner has subscribed for liability insurance covering risks of public liability in an amount that is not less than

- (a) \$1,000,000, where the maximum permissible take-off weight of the aircraft is not greater than 3 402 kg (7,500 pounds);
- (b) \$2,000,000, where the maximum permissible take-off weight of the aircraft is greater than 3 402 kg (7,500 pounds) but not greater than 8 165 kg (18,000 pounds); and
- (c) where the maximum permissible take-off weight of the aircraft is greater than 8 165 kg (18,000 pounds), \$2,000,000 plus an amount determined by multiplying \$150 by the number of pounds by which the maximum permissible take-off weight of the aircraft exceeds 8 165 kg (18,000 pounds).

(6) No aircraft owner referred to in paragraph (2)(a), (b) or (c) shall, in order to comply with subsections (2), (4) and (5), subscribe for any liability insurance that contains an exclusion or waiver provision that reduces the insurance coverage for any incident below the applicable minimum determined pursuant to those subsections, unless that provision

(a) is a standard exclusion clause adopted by the international aviation insurance industry that applies in respect of

- (i) war, hijacking and other perils,
- (ii) noise, pollution and other perils, or
- (iii) radioactive contamination;

(b) is in respect of a chemical drift;

(c) includes a statement that the insurance does not apply in respect of liability assumed by the owner under any contract or agreement unless the liability would have attached to the owner even in the absence of such a contract or agreement; or

(d) includes a statement that the policy is void if the owner has concealed or misrepresented any material fact or circumstance concerning the insurance or the subject thereof or if there is any fraud, attempted fraud or false statement by the owner touching any matter relating to the insurance or the subject thereof, either before or after an incident.

(7) An aircraft owner referred to in paragraph (2)(a), (b) or (c) may comply with subsections (2), (4) and (5) by subscribing for comprehensive single limit liability insurance that consists of a single policy or a combination of primary and supplementary policies.

(8) No aircraft owner not referred to in paragraph (2)(a), (b) or (c) shall operate an aircraft unless, in respect of every incident related to the operation of the aircraft, the owner has subscribed for liability insurance covering risks of public liability in an amount that is not less than

- (a) \$100,000, where the maximum permissible take-off weight of the aircraft is 1 043 kg (2,300 pounds) or less;
- (b) \$500,000, where the maximum permissible take-off weight of the aircraft is greater than 1 043 kg (2,300 pounds) but not greater than 2 268 kg (5,000 pounds);
- (c) \$1,000,000, where the maximum permissible take-off weight of the aircraft is greater than 2 268 kg (5,000 pounds) but not greater than 5 670 kg (12,500 pounds);
- (d) \$2,000,000, where the maximum permissible take-off weight of the aircraft is greater than 5 670 kg (12,500 pounds) but not greater than 34 020 kg (75,000 pounds); and
- (e) \$3,000,000, where the maximum permissible take-off weight of the aircraft is greater than 34 020 kg (75,000 pounds).

(9) Subject to subsection (10), no owner or operator of an aircraft shall operate the aircraft unless there is carried on board the aircraft proof that liability insurance is subscribed for in accordance with this section.

(10) A balloon may be operated without the proof of insurance referred to in subsection (9) being carried on board if that proof is immediately available to the pilot-in-command

- (a) prior to commencing a flight; and
- (b) on completion of a flight.

Synthetic Flight Training Equipment

606.03 (1) No person shall use synthetic flight training equipment for pilot training or a pilot proficiency check required pursuant to Part IV, this Part or Part VII unless there is in force in respect of that equipment a flight simulator certificate or flight training device certificate issued pursuant to subsection (2) or an equivalent approval or certificate issued under the laws of a foreign state with which Canada has an agreement respecting such equipment.

(2) The Minister shall, where it is determined that the synthetic flight training equipment meets the standards set out for that equipment in the *Aeroplane and Rotorcraft Simulator Manual*, issue to the operator of that equipment a flight simulator certificate or flight training device certificate.

(3) A certificate issued pursuant to subsection (2) shall set out the following information:

- (a) the name of the operator of the synthetic flight training equipment;
- (b) the type, model or series number of aircraft represented;
- (c) the qualification level of the synthetic flight training equipment; and
- (d) the date of issuance of the certificate.

(4) No certificate issued pursuant to subsection (2) remains in force unless the synthetic flight training equipment in respect of which the certificate has been issued

(a) maintains the performance, function and other characteristics that are required for the issuance of the certificate, except in the cases set out in the *Simulator Component Inoperative Guide* (SCIG);

(b) is maintained in accordance with the procedures set out in the *Aeroplane and Rotorcraft Simulator Manual*; and

(c) is changed as required, where the aircraft type, model or series number represented by the synthetic flight training equipment undergoes a change as a result of the issuance of an airworthiness directive or an amendment to this Part or Part VII that affects the training being conducted.

(5) A certificate issued pursuant to subsection (2) remains in force where the synthetic flight training equipment in respect of which the certificate has been issued is re-evaluated

(a) in the case of a flight simulator, at least every six months; or

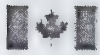
(b) in the case of a flight training device, at least every 12 months.

(6) Subject to subsection (7), the certificate referred to in subsection (5) remains in force

(a) in the case of a flight simulator, until the first day of the seventh month following the month in which the flight simulator was evaluated; or

(b) in the case of a flight training device, until the first day of the thirteenth month following the month in which the flight training device was evaluated.

(7) The Minister may extend the period in respect of which a flight simulator certificate or a flight training device certificate is in force by up to 60 days where the Minister is of the opinion that aviation safety is not likely to be affected.



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CANADIAN AVIATION REGULATIONS

PART VI – GENERAL OPERATING AND FLIGHT RULES

STANDARD 621 – OBSTRUCTION MARKING AND LIGHTING

Canada 

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NOTE

All amendments to the CARs will be indicated by the Coming into Force date, immediately following the amended text.

RECORD OF AMENDMENTS

[illegible]

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PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 621 - OBSTRUCTION MARKING AND LIGHTING

(amended 2011/12/31)

CHAPTER 1 INTRODUCTION

1.1 Definitions

In this Standard:

- “appurtenance” - (*Note: this term is defined as "projection" in the CARs*) means that part of any vertical mast, pole or other appendage added to a building, structure or object that protrudes above the top of the building, structure or object; (*accessoire*)
- “aviation colours” - for lighting, the colours as defined in the ICAO Annex 14; (*couleurs*)
- “beam spread” - means the angle between the two directions in the vertical or horizontal plane in which the intensity is equal to 50 percent of the minimum specified peak beam effective intensity; (*angle d'ouverture du faisceau*)
- “catenary” - means the curved span of overhead wires hung freely between two supporting structures, normally with regard to exceptionally long elevated spans over canyons, rivers and deep valleys; (*caténaire*)
- “effective intensity” - means the effective intensity of a flashing light is equal to the intensity of a steady-burning (fixed) light of the same color which produces the same visual range under identical conditions of observation; (*intensité efficace*) .
- “fixed light” – means a light having constant luminous intensity when observed from a fixed point; (*feu fixe*)
- “lighting” - means any light displayed on an obstruction as a means of indicating the presence of the obstruction to pilots; (*éclairage*)
- “lighting terms” - refer Figure 1-1 (*unités photométriques*)
- (a) Lumen - International System unit of luminous flux equal to the amount of light given out through a solid angle of 1 steradian by a point source of 1 candela intensity radiating uniformly in all directions. The unit expresses the quantity of light output per second. (*lumen*)
- (b) Candela - International System unit of luminous intensity of light emitted from a light source; equal to $\frac{1}{60}$ of the luminous intensity per square centimetre of a blackbody radiating at the temperature of solidification of platinum (2,046°K). A luminous intensity of one candela is

one lumen per steradian (solid angle). The unit expresses the intensity of light within an incremental segment of the beam. (*candela*)

(c) Lux - International System unit of illumination, equal to one lumen per square metre (lm/m^2). The unit expresses the amount of light falling on the surface area. (*lux*)

“marker” - means an object displayed on an obstruction during daytime as a means of indicating the presence of relatively invisible obstructions such as power lines; (*balise*)

“marking” - means a symbol, group of symbols, or markers that are displayed on the surface of an obstruction and intended to reduce hazards to aircraft by indicating the presence of the obstruction by day; (*balisage*)

“meteorological visibility” - means the greatest distance, expressed in statute miles, that selected objects (visibility markers) or lights of moderate intensity at night (25 candela) can be seen and identified under specific conditions of observation; (*visibilité météorologique*)

“painting” - means a marking applied to the surface of an obstruction and intended to identify the presence of the obstruction by day; (*marque de peinture*)

“vertical aiming angle” - means the angle formed between the horizontal and a line through the centre of the vertical beam spread. (*calage en site*)

“wind turbine” means a structure intended for the production of electrical power; comprising a support mast on which is installed a nacelle containing a generator unit and which supports rotor blades that are caused to rotate by the wind. The total height of the obstruction is the height of the nacelle, above ground level (AGL), plus the length of one of the blades held in a vertical position. (*éolienne*)

“wind farm” means a grouping of 3 or more wind turbines. (*parc d'éoliennes*)

“wind farm indicators” means light units installed with specified spacing on selected wind turbines and serving to indicate the location of a wind farm to pilots. (*indicateurs de parc d'éoliennes*)

1.2 Notification Responsibilities

(1) A person planning to erect or modify an obstruction, namely a building, structure or object, including a moored balloon or kite, either permanently or temporarily, contact the appropriate regional Transport Canada Civil Aviation office, as specified in Appendix A, at least 90 days prior to erection and provide the information on the planned obstruction, using the *Aeronautical assessment form for obstruction marking and lighting* as shown in Appendix C:

(2) If it appears that planned construction might create an obstruction to air navigation in the vicinity of a Department of National Defence (DND) aerodrome, the person having responsibility or control over the construction advise the appropriate DND authorities.

Information Note: Any person planning to erect an obstruction should also provide information to Nav Canada, using the “Land Use Proposal Submission Form” (« *Projet d'utilisation particulière d'un terrain* ») which is available from the appropriate Transport Canada regional office. (See Appendix A)

Information Note: Where possible, for objects such as broadcast antennae and wind farms, a sign identifying the owner of the object and providing contact information should be installed at the entrance gate or any other place as appropriate.

CHAPTER 2 GENERAL

2.1 Purpose of Marking and Lighting Requirements

Information Note: The application of the marking and lighting requirements specified in this Standard and the approval of equivalent requirements is to ensure that an obstruction to air navigation remains visible at a range sufficient to permit a pilot in VMC conditions to take appropriate action in order to avoid the obstruction, by not less than 300 m vertically within a horizontal radius of 600 m from the obstruction. In other words, the purpose of obstruction marking and lighting standards is to provide an effective means of indicating the presence of objects likely to present a hazard to aviation safety. Equivalent lighting and marking requirements can be approved depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, depending on the number of structures and overall layout of design, in accordance with the criteria and procedures outlined in sections 2.2 and 2.3. below.

2.2 Shielding

(1) The principle of shielding is applied in a way that a dominant permanent building, structure or object which is marked or lighted, or both, obviates the need for marking or lighting other buildings, structures or objects in the immediate surrounding area, which might otherwise be treated as individual obstructions.

(2) More specifically, the principle of shielding is applied if the marking or lighting, or both, of a dominant permanent building, structure or object is assessed by the Transport Canada regional office as providing sufficient warning to aircraft that, in avoiding the dominant obstruction, they will also avoid the unmarked or unlighted obstructions in the immediate surrounding area without risk of collision.

(3) Where two similar objects of equal height are situated adjacent to each other, as shown in Figure 2-2, one of the two objects may be considered as shielded, provided the separations listed in Table 2-1 are not exceeded.

Table 2-1: Separation between Shielded Objects

Height of Objects AGL (metres)	Maximum Separation (metres)
30 to 75	15
76 to 122	23
123 to 198	30
199 to 290	45
291 and higher	60

(4) A narrow obstruction may be considered as shielded when it is situated with respect to a large obstruction so that an aircraft, whose flight path would avoid the large obstruction would, as a result, also avoid the narrow one..

(5) Adjacent Catenaries

(a) A catenary across a recognized VFR route does not require marking or lighting where it is shielded by a larger object such as a bridge or a higher catenary.

(b) A catenary segment may be considered as shielded when it is situated within 600 m of the marked catenary of the dominant obstruction so that it remains below a sloping down surface at a gradient of 5% projected from the marked catenary. Refer to Figure 2-1.

(c) If the second catenary is above the gradient, this span may not be considered as shielded and is marked or lighted, or both, in accordance with this Standard.

(6) Complex Objects

(a) Where it is not possible to apply a uniform standard to a cluster of objects such as industrial plants, oil refineries, thermal generating stations, and similar structures, they shall be assessed by the Transport Canada regional office on an individual basis to determine whether or not to treat them as hazards to aviation safety or as an extended obstruction, taking into account the objects' location and height.

(b) When treated as an extended obstruction, sufficient marking or lighting, or both, are provided to ensure that the extent of the cluster is defined and visual warning is provided from any angle of aircraft approach.

2.3 Lighting Equipment

(1) Conformance

Information Note: As a basis of ensuring procurement of equipment meets the requirements of this Standard, the person having responsibility or control over the obstruction should obtain an attestation of conformance through an established 3rd Party testing laboratory.

(2) Combined Light Units

Information Note: The requirements specified in this Standard are written with respect to the performance of obstruction lighting, without consideration of how they are actually designed. Manufacturers may supply light sources contained within a single fitting. For example, a combined CL-864 red flashing beacon with a CL-865 white flashing light, as may be used for a dual medium intensity, configuration "E" installation.

2.4 Environmental Evaluation

Information Note: The person having responsibility or control over an obstruction may be required to file an environmental evaluation with the appropriate authority having jurisdiction when seeking authorization for the use of the high intensity flashing white lighting system on structures located in residential neighbourhoods, as defined by the applicable zoning law.

CHAPTER 3 MARKING AND MARKERS

3.1 Scope

Chapter 3 governs marking requirements for obstructions to air navigation in order to make them conspicuous to pilots during daylight.

3.2 Paint Standards

Where alternate sections of aviation orange and white, referred herein as "orange" and "white" paint markings, are required under this Standard to be displayed on a building, structure or object, the colours of paint markings shall be in accordance with United States Federal Standard FED-STD-595B, for colours identified as:

- (a) orange, number 12197; and
- (b) white, number 17875.

3.3 Surfaces Not Requiring Paint

(1) Except as otherwise provided for in Chapter 3, ladders, decks, and walkways of steel towers and similar structures are not to be painted, if a painted surface presents a potential hazard to maintenance personnel.

(2) Subject to subsection (3), paint may be omitted from precision or critical surfaces, if it would have an adverse effect on the transmission or radiation characteristics of a signal.

(3) Where markings are omitted under subsection (1) or (2), the overall marking effect of the structure shall not be reduced to the point of compromising the visibility criteria of section 2.1.

3.4 Use of Plastic Wrapping

In the case of poles, where the use of paint is impractical, a wrapping of plastic or other weather resistant material, in the required colours and dimensions, may be applied instead of painting provided that the colour of the wrapping corresponds as close as possible to that required for a painted marking.

3.5 Paint Patterns

Information Note: The following patterns of painting are dependent upon the size and shape of the structure.

(1) Solid Pattern

A structure is coloured solid orange, if the structure has both horizontal and vertical dimensions not exceeding 3.2 m.

(2) Checkerboard Pattern

(a) Subject to paragraph (c), alternating rectangles of aviation orange and white are displayed on the following types of structure

(i) storage tanks for water, gas, grain, and similar tanks,

(ii) buildings,

(iii) structures that both:

(A) appear broad from a side view, that are 3.2 m or more across horizontally, and

(B) have a horizontal dimension that is equal to or greater than the vertical dimension.

(b) Checkerboard patterns have the following characteristics [refer to Figure 3-1]:

(i) for structures having horizontal and vertical dimensions, both greater than 3.2 m, the sides of the checkerboard pattern measure not less than 1.5 m nor more than 6 m,

(ii) for structures having horizontal or vertical dimensions, both less than 4.5 m, the sides of the checkerboard pattern may be less than 1.5 m, but not less than 1 m,

(iii) the rectangles of the pattern are as nearly square as possible, and

(iv) corners are coloured orange.

(c) The following exceptions apply to the marking requirements set out in this subsection:

- (i) storage tanks not suitable for a checkerboard pattern are coloured with alternating bands of aviation orange and white or a limited checkerboard pattern applied to the upper one-third of the structure, and
- (ii) the skeletal framework of certain water, gas, and grain storage tanks may be excluded, as a result of a risk evaluation, from the checkerboard pattern, where the main structure of the storage tank is large enough that its checkerboard pattern adequately suits the purpose of day marking.

(3) Colour Bands

(a) Subject to subsection (4), alternate bands of orange and white are displayed on the following types of structure:

- (i) communications towers and supporting structures of overhead transmission lines,
- (ii) poles,
- (iii) chimneys,
- (iv) skeletal framework of storage tanks and similar structures,
- (v) wind turbine towers and rotor blades, including the nacelle or generator housing,
- (vi) cables, conduits, and materials attached to the face of a tower, whether at time of construction or when later added to the structure, and
- (vii) structures that appear narrow from a side view, that are 3.2 m or more across horizontally, and the horizontal dimension is less than the vertical dimension.

(b) Bands applied to structures of any height in excess of 3.2 m [Refer to Figure 3-4]:

- (i) are approximately equal in width and to a tolerance of ± 10 percent,
- (ii) are not more than 30 m wide,
- (iii) are coloured orange for the top and bottom bands,
- (iv) have an odd number of bands on the structure, and
- (v) are in accordance with Table 3-1, except that for each additional 60 m or fraction thereof, one (1) additional orange and one (1) additional white band are added.

Table 3-1: Structure Height to Number of Bands Requirement

Structure height (AGL)		
Greater than (metres)	Not exceeding (metres)	Number of Bands
0	3.2	solid
3.2	210	7
210	270	9
270	330	11
330	390	13
390	450	15
450	510	17
510	570	19
570	630	21

(4) Structures With a Cover or Roof

If a structure referred to in subsection (3) has a cover or roof whose profile in the line of sight of approaching aircraft is less than 1.5 m, the highest orange band is continued to cover the entire top of the structure. It is acceptable to have the roof made of a solid orange provided that the structure below has a checkerboard pattern.

(5) Skeletal Structures Atop Buildings

Where a flagpole, skeletal structure, or similar object is erected on top of a building:

- (a) the combined height of the object and the building determines whether marking is required; however, only the height of the object determines the width of the colour bands; and
- (b) if the building is required to have a checkerboard pattern of marking, the object and its height are considered separately for banding determination.

(6) Appurtenances

If a tower or similar skeletal structure is required to have banded marking and it also has an appurtenance of more than 12 m, then the combined height of the appurtenance plus that of the main structure determine the width of the banding.

(7) Partial Marking

If marking is required for only a portion of a structure because of shielding by other objects or terrain:

- (a) the width of the bands is determined by the overall height of the structure;
- (b) a minimum of three bands are displayed on the upper portion of the structure; and
- (c) in the case of cylindrical storage tanks as shown in Figure 3-2, the checkerboard marking may be applied to the top $\frac{1}{2}$ to $\frac{2}{3}$ of the tank.

(8) Teardrop Pattern

Spherical water storage tanks with a single circular standpipe support may be marked in a teardrop-striped pattern having the following characteristics:

- (a) alternate stripes of aviation orange and white are displayed on the tank, as shown in Figure 3-2;
- (b) the stripes extend from the top centre of the tank to its supporting standpipe; and
- (c) the width of the stripes are nearly as equal as possible and the width at the greatest girth of the tank is not to be less than 1.5 m nor more than 6 m.

(9) Community Names

If it is desirable to paint the name of the community on the side of a tank, the marking pattern may be broken for a height of not more than 1.0 m to serve this purpose.

3.6 Flag Markers

(1) Application

One or several flags may be used as markers instead of paint to indicate the presence of certain structures or objects when it is technically impractical to use spherical markers or painting.

***Information Note:** Some examples of structures or objects where flags may be used are temporary construction equipment, cranes, derricks, oil and other drilling rigs.*

(2) Characteristics

Flags used as markers under subsection (1) have the following characteristics:

- (a) Minimum Size - each side of a flag is at least 0.6 m in length;
- (b) Colour Patterns - they are coloured as follows:
 - (i) if solid, the colour is orange,
 - (ii) if orange and white colours are used, two triangular sections, one aviation orange and the other white, are arranged to form a rectangle, or

(iii) a checkerboard pattern of aviation orange and white squares of 0.3 m to a side, is used if the flags are 0.9 m or larger;

(c) Shape - they are rectangular in shape and have stiffeners to keep it from drooping in calm wind; and

(d) Manner of Display - they are displayed as follows:

(i) around, on top, or along the highest edge of the obstruction,

(ii) when used to mark extensive or closely grouped obstructions, the flags are displayed approximately 15 m apart, and

(iii) the flag stakes are to be of such strength and height that they are able to support the flags above all surrounding ground, structures, or objects of natural growth, as the case may be.

3.7 Omission of Marking with Use of Lighting

A high or medium intensity white flashing lighting system may be used in place of marking if the following conditions are met:

(a) the lighting system is operated 24 hours a day; and

(b) in the case of a medium intensity lighting system, the system:

(i) is operated 24 hours per day, and

(ii) the structure on which it is used is 150 m AGL or less.

CHAPTER 4 LIGHTING, GENERAL

4.1 Scope

Chapter 4 governs lighting requirements for obstructions to air navigation in order to make them conspicuous to pilots during night time, except as otherwise provided for in this Standard. It also governs the marking requirements of catenary wires, catenary support structures, moored balloons and kites, for daytime.

Information Note: *Lighting is used to warn pilots of a potential collision during night time operations. If the lighting is of sufficient intensity, it may also serve to give warning during daytime operations and may be approved, by way of a risk evaluation, in lieu of other means of day marking. Criteria for lighting structures, as a result of a risk evaluation, can vary depending on terrain features, weather patterns, and geographic location.*

4.2 Lighting Systems

(1) Configurations

Obstruction lighting is displayed on a building, structure or object in one of six configurations, as shown in Figure 4-1 and listed in Table 4-2.

Information Note: The following is a listing of light units required under this Standard. Chapter 13 provides detailed characteristics of these light units. Appendix B contains the governing electrotechnical requirements and quality assurance testing.

Table 4-1: Light Units

Type	Intensity	Colour	Signal	Flash Rate (fpm)
CL-810	Low	red	fixed	n/a
CL-864	Medium	red	flashing	20-40
CL-865	Medium	white	flashing	40
CL-866, Catenary	Medium	white	flashing	60
CL-885, Catenary	Medium	red	flashing	60
CL-856	High	white	flashing	40
CL-857, Catenary	High	white	flashing	60

Note 1: In certain cases, some of these lights are supplied as a combined unit (e.g. CL-864/CL-865)

Note 2: fpm = flashes per minute

Table 4-2: Lighting Configurations

Configuration	Lighting
A	CL-810 low and CL-864 medium intensity red lighting system
B	CL-856 white high intensity (without appurtenance lighting)
C	CL-856 white high intensity (with CL-865 appurtenance lighting)
D	CL-866 white medium intensity
E	Dual CL-810/CL-864 red with CL-865 white medium intensity lighting
F	Dual CL-810/CL-864 red with CL-856 white high intensity lighting

(2) Red Lighting Systems

A red obstruction lighting system consists of CL-810 low intensity steady burning aviation red lights and CL-864 medium intensity red flashing aviation beacons.

(3) CL-865 Medium Intensity White Flashing Lighting Systems

(a) A medium intensity white flashing lighting system consists of CL-865 medium intensity flashing white lights used during day/twilight with automatically selected reduced intensity for night time operation.

(b) When the system is used on a building, structure or object 150 m AGL or less in height, the marking requirements may be omitted.

Information Note 1: No exemption applies from the requirement to display markings on a building, structure or object exceeding 150 m AGL that has a CL-865 medium intensity white flashing lighting system.

Information Note 2: This lighting system is not normally recommended on buildings, structures or objects 60 m AGL or less.

(4) High Intensity White Flashing Lighting Systems

(a) A high intensity white flashing lighting system consists of CL-856 and CL-857 high intensity flashing white lights used during daytime with automatically selected reduced intensities for twilight and night time operations.

(b) When the system is in use, the markings and the other lights required to be displayed on the building, structure or object may be omitted.

Information Note: This lighting system should not be used on buildings, structures or objects 150 m AGL or less, unless a risk evaluation shows otherwise.

(5) Dual Lighting Installation

(a) A dual lighting system consists of red lights for night time use and high or medium intensity flashing white lights for daytime and twilight use.

(b) When a dual lighting system incorporates medium flashing intensity lights on a building, structure or object 150 m or less in height, or high intensity flashing white lights on a building, structure or object of any height, the marking and the other lighting requirements may be omitted.

Information Note: When a building, structure or object is located in an urban area where there are numerous other white lights (e.g., streetlights, etc.), red obstruction lights with painting or a medium intensity dual system is recommended.

4.3 Floodlighting

(1) A chimney, church steeple or similar obstruction not exceeding 150 m in height, may be floodlighted by three or more fixed search light projectors installed at equidistant points around the base of the obstruction.

(2) Where floodlighting is used for an obstruction referred to in subsection (1), the top 1/3 of the structure shall be provided with at least 30 lux of illumination as directed from the object horizontally to an approaching pilot, assuming diffuse reflection from the object.

4.4 Obstruction Lights During Construction

(1) As the height of a building, structure or object under construction progressively exceeds each level at which permanent obstruction lights would be required, two or more temporary medium intensity white flashing lights are installed at that level.

(2) Temporary lighting required under subsection (1) is operated 24 hours a day until all permanent lights required under this Standard are in operation.

(3) If practical, permanent obstruction lighting required under this Standard shall be installed and operated at each level as construction progresses.

(4) The lights shall be positioned to ensure that a pilot has an unobstructed view from any angle of approach of at least one light at each level.

4.5 Temporary Construction Equipment Lighting

Information Note: Since there is such a variance in construction cranes, derricks, oil and other drilling rigs, each case should be assessed individually. However, in principle, lights should be installed according to the standards given herein, as they would apply to permanent structures.

4.6 Groups of Obstructions

(1) When individual buildings, structures or objects within a group of obstructions are not the same height and are spaced more than 45 m apart, the prominent building, structure or object within the group is lighted in accordance with the standards for individual obstructions of a corresponding height.

(2) If an outer building or structure is shorter than the prominent one, it is lighted in accordance with the requirements for individual obstructions of a corresponding height.

(3) Light units required under this section are placed to ensure that the light is visible to a pilot approaching from any direction.

(4) In addition to the requirement set out in subsection (3), at least one flashing beacon is installed at the top of a prominent centre obstruction or on a special tower located near the centre of the group.

(5) If there is no prominent centre obstruction, a risk evaluation shall be performed to assess the location of the applicable beacons.

4.7 Monitoring of Obstruction Lights

(1) An obstruction lighting system required under Chapter 4 is monitored by visual or automatic means.

(2) On a system without automatic monitoring, the obstruction lighting is visually inspected in all operating intensities at least once every 24 hours.

(3) If the lighting system of a building, structure or object is not readily accessible for visual observation, a properly maintained automatic monitor is used.

(4) The monitor referred to in subsection (3) is designed to register the malfunction of any light on the obstruction regardless of its position or colour.

(5) When using a remote monitoring device, the communication status of the device and operational status of the lighting system is confirmed at least once every 24 hours.

(6) The monitor display is located in an area occupied by responsible personnel where the status of the lighting can be noted at least once every 24 hours.

(7) The owner or operator of the obstruction lighting system advises NAV CANADA, as soon as possible, of any obstruction lighting failures so that an appropriate NOTAM action can be initiated.

4.8 Glare from Flashing Obstruction Lights

(1) Where obstruction lighting is likely to distract operators of aircraft, railway trains, surface vessels, and other vehicles, or if the lighting is in a congested residential area, a suitable shield is installed on the appropriate lights to minimize the glare effects of the light.

(2) The application of such shielding shall not diminish the required performance of the light as specified in Chapter 13 of this Standard for obstruction identification to pilots.

(3) Shielding applied to the exterior of the light unit is suitable for environmental conditions such as snow, ice and frost cover, so that the light output is not degraded from that required by this Standard.

(4) In the proximity of navigable waterways or along coastal regions, the installation of an obstruction lighting system is coordinated with marine authorities by the owner or operator of the obstruction in order to avoid interference with marine navigation.

4.9 Placement Factors

(1) The height of a building, structure or object above ground (AGL) is used to determine the number of light levels required to be installed as part of a lighting system.

(2) The height of light levels required to be installed may be adjusted slightly, but not to exceed 3 m, when necessary to accommodate guy wires and personnel who replace or repair light fixtures.

(3) Except for catenary support structures, the following factors are considered when determining the placement of obstruction lights on a building, structure or object:

(a) for a red obstruction lighting system or a medium intensity white flashing lighting system, the overall height of the structure including all appurtenances such as rods, antennae, obstruction lights and similar objects, determine the number of light levels;

(b) for a high intensity white flashing lighting system,

(i) the overall height of the main structure excluding all appurtenances is used to determine the number of light levels, and

(ii) if required, a CL-865 medium intensity flashing light is displayed on the highest portion of any antenna or other appurtenance supported by the main structure; and

(c) for a dual obstruction lighting system, the determination of the number of light levels is in conformity with the pertinent requirements for white and red lighting systems.

(4) The elevation of the tops of adjacent buildings or structures in congested areas is used as the equivalent of ground level to determine the proper number of light levels required.

(5) If an adjacent building, structure or object shields any light, horizontal placement of the lights is adjusted or additional lights are mounted on that object to retain or contribute to the definition of the obstruction.

4.10 Ice Protectors

(1) Where icing is likely to occur, metal grates or similar protective means are installed directly over each light unit required under this Standard to be installed on a building structure or object to prevent falling ice or accumulations from damaging the light units.

(2) The protective means are of a design and manner of placement such that the required photometric output of the fixtures is not affected.

CHAPTER 5 RED OBSTRUCTION LIGHTING SYSTEM, CONFIGURATION "A"

5.1 Scope

Chapter 5 governs obstruction lighting that uses a configuration "A" lighting system.

5.2 System Requirements

(1) General

(a) A configuration “A” red obstruction lighting system consists of one or several, as required under Chapter 5, CL-864 red flashing beacons or CL-810 steady burning red lights, or a combination thereof.

(b) When red lighting alone is used for night protection, no exemption to markings required under this Standard is allowed.

Information Note: The CL-810 comes in two forms; a single unit [one lamp and one globe] and a double unit [two lamps and two globes].

(2) Double Obstruction Light Units

Subject to subsection (3), when used as a top light or in areas or locations where the failure of a single unit could cause an obstruction to be totally unlighted, double unit CL-810 lights are installed at each end of a row of single unit obstruction lights, and more specifically as follows:

(a) Top Level on a structure, building or object 45 m AGL or less, one or more double unit lights operating simultaneously are installed at the highest point;

(b) Intermediate levels,

(i) double unit lights are installed when a malfunction of a single unit light could create an unsafe condition and in remote areas where maintenance cannot be performed within a reasonable time, and

(ii) both lamps of the double unit operate simultaneously or a transfer relay is used to switch to the inactive lamp should the active lamp fail; and

(c) Lowest Level at the lowest level of a building, structure or object,

(i) light units may be installed at a higher elevation than standard if the surrounding terrain, trees or any adjacent buildings would obscure the lights, or

(ii) in certain exceptional instances, as determined by a risk evaluation, the lighting otherwise required for the lowest level may be omitted.

(3) Single CL-810 Obstruction Light Units

Where more than one obstruction light is required either vertically or horizontally, or where maintenance can be accomplished within a reasonable period of time, single unit CL-810 lights may be used as follows:

(a) Top Level atop structures such as airport ILS buildings and long horizontal structures such as perimeter fences and building roof outlines; or

(b) Intermediate Level at intermediate levels on skeletal or solid structures when more than one level of lights is required to be installed and there are two or more single units per level.

(4) Flashing Display

When one or more levels of lights are comprised of CL-864 flashing beacons, the lights shall flash simultaneously.

(5) Equivalent Method of Displaying Obstruction Lights

Provided that approval is obtained following the result of a risk evaluation, lights may be placed on poles equal to the height of the building, structure or object required to be lighted, and may be installed on or adjacent to such building, structure or object.

5.3 *Radio and Television Towers and Similar Skeletal Structures*

The following requirements apply to radio and television towers, supporting structures for overhead transmission lines, and similar structures. Refer to Figures 5-1 and 5-2.

(1) On the topmost part of a structure:

- (a) 45 m AGL or less, two or more steady burning lights are installed; or
- (b) exceeding 45 m AGL, at least one red flashing beacon is installed.

(2) On the intermediate levels of a structure:

- (a) the number of levels of lights is in accordance with Figure 5-1;
- (b) the number of lights at each level is determined by the shape and height of the structure;
- (c) the lights are installed so as to provide an unobstructed view of at least one light by a pilot from any angle of approach;

(d) where CL-810 steady burning red lights are installed on:

(i) a structure 105 m AGL or less, two or more steady burning red lights are installed on diagonally or diametrically opposite positions, and

(ii) a triangular shaped structure 105 m AGL or less:

(A) two red light units, single or double, are installed, provided that at least one can be viewed unobstructed by a pilot from any angle of approach, or

(B) where the requirement specified in clause (A) is impractical, three red light units are installed, one on each apex of the triangular cross-section, or

(iii) a structure exceeding 105 m AGL, a steady burning red light is installed on each outside corner at each level; and

(e) where a CL-864 flashing red beacon is used on a structure exceeding 105 m AGL, the red flashing beacon is properly installed within the structure, except that if the structural members impair the viewing of the beacon, two flashing red beacons are installed on the outside of diagonally or diametrically opposite positions at each level.

(3) Appurtenances

Where a building, structure or object required to be lighted includes an appurtenance such as a rod, antenna, or similar extension, a topmost light is installed above the main part of the building, structure or object in accordance with the provisions of this subsection.

- (a) Where the appurtenance is 12 m or less in height and:
 - (i) is incapable of supporting a red flashing beacon, the beacon may be placed at the base of the appurtenance, or
 - (ii) if the mounting location does not allow unobstructed viewing of the beacon by a pilot from any angle of approach, additional beacons are added.
- (b) Where the appurtenance exceeds 12 m in height and:
 - (i) is incapable of supporting a red flashing beacon, a supporting mast with one or more beacons is installed adjacent to the appurtenance, and
 - (ii) the adjacent installation of (i) does not exceed the height of the appurtenance and is within 12 m of the tip of the appurtenance to allow the pilot an unobstructed view of at least one beacon, from any angle of approach.

5.4 Chimneys, Flare Stacks and Similar Solid Structures

(1) Lighting Levels and Location

- (a) CL-810 and CL-864 obstruction lights used on a chimney, flare stack or similar solid structure are installed in accordance with Figure 5-1.
- (b) The topmost lights may be located up to 6 m below the top of the structure to avoid the obscuring effect of emissions.

(2) Number of Light Units per Level

Subject to subsection (3), the number of lights to be installed at the top and at each level of a chimney, flare stack or similar solid structure depends on the diameter of the structure and is in accordance with Table 5-1.

Table 5-1: Number of lights

Diameter	Number of Lights at top and per level
6 m or less	3
6 m to 30 m	4
30 m to 60 m	6
more than 60 m	8

(3) Hyperbolic Cooling Towers

Where any cooling tower of a nuclear generating station:

- (a) is 180 m in height or less AGL, intermediate light levels may be omitted; or
- (b) exceeds 180 m AGL in height, a second level of light units is installed approximately at the midpoint of the structure and in a vertical line with the top level of lights.

5.5 *Prominent Buildings and Similar Extensive Obstructions*

(1) Subject to subsection (4), individual obstructions having a similar height above ground and located not more than 45 m apart within a group of obstructions may be considered as an extensive obstruction for lighting purposes, in which case the group displays steady burning red lights to indicate the extent of the obstruction as specified in this section.

(2) On a structure 45 m or less in both horizontal dimensions, a CL-810 light is displayed:

- (a) on the highest point at each end of the major axis of the obstruction; or
- (b) in the centre of the highest point.

(3) Structures Exceeding 45 m in any Horizontal Dimension

(a) On a structure exceeding 45 m in any horizontal dimension, CL-810 lights are displayed on:

- (i) the highest point at each end of the obstruction, and
- (ii) the highest points for each 45 m, or fraction thereof, for the overall length of the major axis.

(b) If the minor axis of a structure exceeding 45 m in one of its horizontal dimensions is 45 m or less in length, the lights referred to in paragraph (a) may be installed as a row along the middle or along either side, as shown in Figure 5-3.

(c) If a structure exceeding 45 m in any horizontal dimension is located near a landing area and two or more edges of the structure are of the same height, the edge nearest the landing area is lighted with CL-810 lights.

(4) Structures Exceeding 45 m AGL

(a) Top Lights - CL-810 steady burning red lights are installed on the highest point at each end of a structure exceeding 45 m AGL in height.

(b) At intermediate levels of the structure,

- (i) a CL-810 steady burning red light is displayed for each 45 m or fraction thereof,
- (ii) the vertical position of the intermediate lights is equidistant between the top lights and the ground level as the shape and type of obstruction will permit, and

(iii) one CL-810 steady burning red light is displayed at each outside corner on each level with the remaining lights evenly spaced between the corner lights.

(5) Exceptions

Flashing red CL-864 beacons may be used instead of steady burning lights if early or special warning to pilots is necessary, provided that, in the case of an extensive obstruction:

(a) they are displayed on the highest points of the obstruction, at intervals not exceeding 900 m; and

(b) at least three beacons are displayed on one side of the obstruction to indicate a line of lights.

5.6 Bridges

(1) A bridge assessed through a risk evaluation as a likely hazard to aviation safety has CL-864 red flashing lighting, as shown in Figure 5-4.

(2) If the bridge referred to in subsection (1) is over navigable water, the obstruction lighting installer consults with the Coast Guard to avoid interference with signals to marine navigation.

5.7 Groups of Objects

(1) Of Different Height

(a) A group of objects, except wind turbines, of varying heights is lighted in accordance with the requirements specified for individual obstructions of a corresponding height.

(b) In addition, at least one medium intensity flashing white light is installed at the top of a prominent centre obstruction or on a special tower located near the centre of the group.

(2) Of Similar Height

A group of objects of equal height is lighted in accordance with the requirements specified in section 5.5.

5.8 Characteristics of Lights

Lighting displayed on a bridge has the light characteristics specified in Chapter 13.

CHAPTER 6 MEDIUM INTENSITY WHITE FLASHING SYSTEM, CONFIGURATION “D”

6.1 Scope

Chapter 6 governs obstruction lighting that uses a configuration “D” lighting system.

6.2 Application

CL-865 medium intensity white flashing light units:

- (a) are used during daytime and twilight with automatically selected reduced intensity for night time operation;
- (b) where used on a building, structure or object 150 m AGL or less in height, may result in day marking otherwise required under Chapter 3 being omitted on the building, structure or object; and
- (c) where used on a building, structure or object greater than 150 m AGL, shall not result in any day marking required under Chapter 3 being omitted on the building, structure or object.

Information Note: *CL-865 medium intensity white flashing light units should not be used:*

- (1) *on a building, structure or object 60 m AGL or less in height;*
- (2) *in populated urban areas due to their tendency to merge with background lighting in these areas at night and the cause of glare complaints; and*
- (3) *on structures within 5 kilometres of an airport.*

6.3 Characteristics

(1) Photometrics

The photometric output of a configuration “D” lighting system is in accordance with Table 13-2.

(2) Control

The lighting system is in accordance with Table 13-1 for day, twilight and night modes of operation.

6.4 Radio and Television Tower and Similar Skeletal Structures

(1) Subject to subsection (4), on a radio or television tower, or similar skeletal structure, the number of light levels to be installed depends on the height of the structure, including antennae and similar appurtenances, and is determined in accordance with Figure 6-1.

(2) Top Level

One or more light units are installed at the highest point of a skeletal structure to provide 360-degree coverage ensuring an unobstructed view.

(3) Intermediate Levels

At an intermediate level of a skeletal structure, two CL-865 beacons are mounted outside, at diagonally or diametrically opposite positions of the intermediate level.

(4) Lowest Level

At the lowest level of light units of a skeletal structure:

- (a) the light units may be installed at a higher elevation than that required under this section for the structure, if the surrounding terrain, trees, or any adjacent building would obscure the light units;
- (b) in circumstances determined by a risk evaluation, the light units may be omitted; and
- (c) CL-865 light units are not to be installed at a height of less than 60 m.

(5) Appurtenances

An appurtenance is lighted in accordance with the requirements specified in subsection 5.3(3), except as far as the use of the CL-865 light in place of CL-864 light is concerned.

6.5 *Chimneys, Flare Stacks, and Similar Solid Structures*

(1) Lighting Levels and Location

The number of levels of light units required to be installed on a chimney, a flare stack or similar solid structure is determined in accordance with Figure 6-1.

(2) Number of Light Units per Level

The number of light units required to be installed on each level of a solid structure referred to in subsection (1), is determined in accordance with Table 5-1.

6.6 *Hyperbolic Cooling Towers*

A hyperbolic cooling tower is lighted in accordance with the requirements specified in section 5.4.

6.7 Prominent Buildings and Similar Extensive Obstructions

- (1) Application is that of section 5.7, except with the use of CL-865 medium intensity white flashing lights.
- (2) Due to the glare factor, caution shall be used in the application of medium intensity white flashing lights.

6.8 Bridges

A bridge is lighted in accordance with the requirements specified in section 5.6.

CHAPTER 7 HIGH INTENSITY WHITE FLASHING SYSTEM, CONFIGURATION “B” AND “C”

7.1 Scope

Chapter 7 governs obstruction lighting that uses a configuration “B” and “C” lighting system.

7.2 Application

When a high intensity white flashing lighting system is operated 24 hours a day, the marking requirements and the other applicable lighting requirements for an obstruction may be omitted.

Information Note: This lighting system is not recommended on structures 150 m AGL or less, unless a risk evaluation shows otherwise.

7.3 Characteristics

(1) Photometrics

The photometric output of a high intensity white flashing lighting system is in accordance with Table 13-2.

(2) Control

The lighting system is controlled in accordance with Table 13-1 for day, twilight and night modes of operation.

7.4 Installation

(1) Vertical Aiming

In order to avoid potential glare problems, the vertical aiming angle of a CL-856 light unit used in a high intensity white flashing system is as follows:

Location

(a) the unit is adjusted to compensate for its height above ground, in accordance with Table 7-1; and

Table 7-1: Vertical Aiming of HI Light Units

Location of light unit AGL (metres)	Beam angle adjustment (degrees)
higher than 153 m	0
122 to 153 m	1
92 to 121 m	2
lower than 92 m	3

Terrain

(b)

- (i) where terrain, nearby residential areas, or other situations dictate, the light beam of a light unit may be further elevated above the horizontal,
- (ii) the main beam of light unit located at the lowest level of a building, structure or object shall not strike the ground closer than 5 km from the building, structure or object,
- (iii) if additional adjustments are necessary, light units may be individually adjusted upward, in 1 degree increments, starting at the bottom of the building structure or object,
- (iv) excessive elevation, however, may reduce conspicuousness by raising the beam above a collision course flight path,
- (v) where the lighting system is installed on a building, structure or object located near a highway, waterway, or airport approach area, shielding or vertical or horizontal aiming adjustments, or both, shall be made as necessary to avoid causing glare, and
- (vi) adjustment of light units shall not derogate from the conspicuousness requirement set out in section 2.1 of this Standard.

(2) Relocation or Omission of Light Units

Where any light units are obstructed from view by a building, structure or object, including surrounding terrain and trees, the following actions may be taken:

Lowest Level

(a) in the case of the lowest level of lights:

- (i) the light units may be installed at a higher elevation than that required under Chapter 7, and

- (ii) in circumstances determined by a risk evaluation, the light units may be omitted; and

Two Adjacent Structures

(b) in the case of adjacent buildings or structures:

- (i) if two buildings or structures are situated within 150 m of each other and their respective light units are installed at similar levels, the light units on the sides of the buildings or structures facing each other may be omitted provided that all lights on both structures flash simultaneously, except for adjacent catenary support structures,
- (ii) vertical placement of the lights to either or both structures' intermediate levels is adjusted to place the lights on the same horizontal plane,
- (iii) where one building or structure is higher than the other, one or more complete levels of light units, as the case may be, is installed on that part of the higher building or structure that extends above the top of the lower structure, and
- (iv) if the structures are of such heights that their respective levels of lights cannot be placed in identical horizontal planes, the levels of light units are placed such that the centre of the horizontal beam patterns does not face toward the adjacent building or structure; and

Information Note: For example, based on subparagraph (iv) above, structures situated north and south of each other will have the light units on both structures installed on a northwest/southeast and northeast/southwest orientation.

Three or More Adjacent Structures

- (c) the treatment of a cluster of structures as an individual or a complex of structures is determined by way of a risk evaluation, taking into consideration the location, heights, and spacing with other structures.

7.5 Radio and TV Towers and Similar Skeletal Structures

(1) Top Level

On a radio, TV tower or similar skeletal structure, one level of light units is installed within 3 m of the highest point of the main structure.

(2) Intermediate Levels

On a skeletal structure referred to in subsection (1):

- (a) the number of levels of light units to be installed depends on the height of the structure, excluding any appurtenances, and is determined in accordance with Figure 7-1; and
- (b) at least three lights are installed on each intermediate level and mounted to ensure that the effective intensity of the full horizontal beam coverage is not impaired by the structural members.

(3) Appurtenances

Where a skeletal structure has an appurtenance in excess of 12 m in height above it:

- (a) a medium intensity white flashing light is installed in accordance with subsection 6.4(5); and
- (b) the light referred to in paragraph (a) operates 24 hours a day and flashes simultaneously with the rest of the lighting system installed on the structure.

7.6 Chimneys, Flare Stacks and Similar Solid Structures**(1) Lighting Levels and Location**

The number of levels of light units required to be installed on a chimney, flare stack or similar solid structure is determined in accordance with Figure 7-1.

(2) Number of Light Units per Level

The number of light units required to be installed on each level of the high intensity white flashing lighting system of a structure referred to in subsection (1), is determined in accordance with Table 5-1.

(3) Hyperbolic Cooling Towers

Where any cooling tower of a nuclear generating station:

- (a) is 180 m in height or less AGL, intermediate light levels may be omitted; or
- (b) exceeds 180 m AGL in height, a second level of light units is installed approximately at the midpoint of the structure and in a vertical line with the top level of lights.

7.7 Prominent Buildings, Structures and Similar Extensive Objects

(1) Individual buildings, structures or objects having a similar height above ground and located not more than 60 m apart within a group of obstructions may be considered as an extensive obstruction for lighting purposes, in which case the group displays CL-856 white flashing light units to indicate the extent of the obstruction as specified in this section.

Information Note: *Owing to the glare factor, caution shall be used in the application of high intensity white flashing lights.*

- (2) On a structure 60 m or less in both horizontal dimensions, a CL-856 light is displayed:
 - (a) on the highest point at each end of the major axis of the obstruction; or
 - (b) in the centre of the highest point.

(3) Structures Exceeding 60 m in any Horizontal Dimension

(a) On a structure exceeding 60 m in any horizontal dimension, CL-856 light units are displayed on:

- (i) the highest point at each end of the obstruction, and
- (ii) the highest points for each 60 m, or fraction thereof, for the overall length of the major axis.

(b) If the minor axis of a structure exceeding 60 m in one of its horizontal dimensions is 60 m or less in length, the lights referred to in paragraph (a) may be installed as a row along the middle or along either side, as shown in Figure 5-3.

(4) Structures Exceeding 150 m AGL

Top Lights

(a) A CL-856 white flashing light unit is installed on the highest point at each end of a structure exceeding 150 m AGL in height.

(b) At intermediate levels of the structure,

- (i) a CL-856 white flashing unit is displayed for each 150 m or fraction thereof,
- (ii) the vertical position of the intermediate lights is equidistant between the top lights and the ground level as the shape and type of obstruction will permit, and
- (iii) a CL-856 white flashing unit is displayed at each outside corner on each level with the remaining lights evenly spaced between the corner lights.

CHAPTER 8 DUAL RED/WHITE MEDIUM INTENSITY LIGHTING SYSTEM, CONFIGURATION "E"

8.1 Scope

Chapter 8 governs obstruction lighting that uses a configuration "E" lighting system consisting of CL-810 steady burning red and CL-864 flashing red obstruction light units for nighttime operation and CL-865 medium intensity white flashing light units for daytime and twilight operation.

Information Note: *This lighting system may be used in lieu of operating a CL-865 medium intensity white flashing system at night, in order to avoid glare complaints particularly in populated urban areas.*

8.2 Application

- (1) The light units of the system are installed as required by the relevant provisions of
- (a) Chapter 4 for lighting in general;
 - (b) Chapter 5 for red lighting; and
 - (c) Chapter 6 for medium intensity lighting.
- (2) The number of light levels needed is obtained from Figures 5-1 and 6-1 for the applicable components of the lighting system.

8.3 Operation

The lighting system is operated such that:

- (a) both the red and white systems are not operated at the same time;
- (b) there is no more than a 2-second delay when changing from one system to the other; and
- (c) outage of one of two lamps in the uppermost CL-864 red flashing beacon or outage of any uppermost red light causes the white obstruction lighting system to operate in its specified “night” step intensity.

8.4 Control Device

The lighting system is controlled such that:

- (a) a photocell device causes a change of operation from red to white lighting with an increase and decrease of the ambient light level;
- (b) the system automatically changes from white to red and subsequently from red to white when the northern sky illuminance, as indicated in Table 13-1, goes through the transitions of twilight to night and night to twilight respectively; and
- (c) where a malfunction requires the white lighting system to be operated during the night, the device causes operation at the lower intensity level.

8.5 Antenna or Similar Appurtenance Light

When a structure utilizing this dual lighting system is topped with an antenna or similar appurtenance exceeding 12 m in height above the structure:

- (a) a CL-865 medium intensity white flashing light and a CL-864 red flashing beacon is placed within 12 m from the tip of the appurtenance;
- (b) the CL-865 white light operates during daytime and twilight and the red light during nighttime; and
- (c) the lights required in paragraphs (a) and (b) flash simultaneously with the rest of the lighting system.

8.6 Omission of Marking

When medium intensity white lights are operated on a structure 150 m AGL or less during daytime and twilight, the markings required under this Standard may be omitted on the structure.

CHAPTER 9 DUAL RED/WHITE HIGH INTENSITY FLASHING SYSTEM, CONFIGURATION “F”

9.1 Scope

Chapter 9 governs obstruction lighting that uses a configuration “F” lighting system referred to in Table 4-2.

Information Note: *This lighting system may be used in lieu of operating a white flashing lighting system at night. There may be populated urban areas where the use of high intensity lights at night may cause environmental complaints.*

9.2 Light Units

CL-810 and CL-864 red light units shall be used for night time lighting and CL-856 high intensity white flashing light units shall be used for daytime and twilight lighting.

9.3 Installation

The light units required under section 9.2 shall be installed in accordance with the relevant provisions of Chapter 4 for lighting in general, of Chapter 5 for red lighting and Chapter 7 for high intensity white flashing lighting.

9.4 Operation

A configuration “F” lighting system shall:

(a) be operated in accordance with the requirements of:

- (i) Chapter 4 for lighting in general,
- (ii) Chapter 5 for red lighting, and
- (iii) Chapter 7 for high intensity white flashing lighting;

(b) not have both red and white lighting systems operating at the same time; however, there shall be no more than a 2-second delay when changing from one colour of lighting system to the other; and

(c) where an outage of one of two lamps in the uppermost CL-864 red beacon or an outage of any uppermost red light unit occurs, have the white lighting switched on and operating in its specified night mode of intensity.

9.5 Control Device

The light intensity of a configuration “F” lighting system shall be controlled by a photocell device set to operate in accordance with Table 13-1 for transition between day, twilight and night.

9.6 Antenna or Similar Appurtenance Light

(1) Where a configuration “F” lighting system is used on a building, structure or object that is topped with an antenna or similar appurtenance exceeding 12 m in height above it, both a CL-864 medium red flashing and a CL-865 medium intensity white flashing light unit is placed within 12 m from the tip of the appurtenance.

(2) The white light unit referred to in subsection (1) operates during daytime and twilight, and the red light unit during night time.

9.7 Omission of Marking

When high intensity white flashing light units are operated during daytime and twilight, any day marking otherwise required under Chapter 3 to be displayed on the building, structure or object may be omitted.

CHAPTER 10 MARKING AND LIGHTING OF CATENARIES

10.1 Scope

Chapter 10 governs obstruction marking and lighting of a catenary wire and a catenary support structure.

10.2 Marking of Catenary Support Structures

A support structure of a power line is painted in alternate bands of orange and white in accordance with section 3.4, and is clear of trees and brush insofar as practicable. [refer to information note in section 2.1]

10.3 Shore Markers

Where, according to a risk assessment, the marking of a support structure would not clearly indicate the presence of a catenary, a shore marker is displayed as indicated in Figure 10-1, and:

(a) is painted aviation orange and white

(b) is either of:

- (i) a panel type, designed as a 6 m square panel with a 5 m diameter aviation orange dot, or
- (ii) a pole type.

10.4 Catenary Markers

Spherical markers are displayed on a catenary, as indicated in Figure 10-1 and as specified below, unless equivalent markings are approved by the Minister as a result of a risk assessment:

(1) Dimensions and spacing

Each marker has the following diameters and associated spacings on the catenary:

- (a) 50 cm diameter and 30 m spacing;
- (b) 75 cm diameter and 45 m spacing;
- (c) 150 cm diameter and 90 to 120 m spacing; and
- (d) other dimensions may be approved by the Minister, if necessary, as determined by a risk assessment, provided that due consideration is given to the overall obstacle avoidance distances referred to in section 2.1.

(2) Minimum Quantity

Where the length of the catenary span is less than twice the spacing, depending on the size of marker as that indicated in subsection (1), not less than two markers are used.

(3) Location

Markers are displayed:

- (a) on the highest wire or by other means at the same height; or
- (b) where there is more than one wire at the highest level, the markers may be installed alternately along each wire, as indicated in Figure 10-1, as long as the distance between adjacent markers meets the spacing standard.

Information Note: *This method will allow the weight and wind loading factors to be distributed.*

(4) Colour Pattern

Markers have the following colour patterns:

- (a) on overhead wires, they are marked by alternating solid colour spheres of orange and white;
- (b) an orange marker is placed at each end of the overhead wire and its spacing adjusted to accommodate the rest of the markers; and
- (c) when less than four markers are needed, they are all orange.

10.5 Omission of Marking

Marking of a catenary wire or a support structure may be omitted, where:

- (a) the height of the support structure is 150 m AGL or less, and CL-866 lights are installed on the support structure and operated 24 hours a day; or
- (b) CL-857 high intensity white flashing light units are installed on the support structure and operated 24 hours a day.

10.6 Lighting of Catenary Wires

(1) Light units are installed along a catenary wire, either separately or in combination with a day marker, provided that the light units are:

- (a) used on transmission line catenary near airports, heliports, across rivers, canyons, lakes, and similar geographical features;
- (b) visible by a pilot from any normal angle of approach;
- (c) meet the requirements specified for the CL-810 light unit;
- (d) used on the highest energized line;
- (e) located within 6 m of the day marker if the light unit is separate from the day marker; and
- (f) spaced at the same interval as that required for the day markers on the same catenary.

(2) Lighting of catenary wires is not required where lighting in accordance with section 10.7 or 10.8 is installed, unless otherwise determined following a risk assessment.

10.7 Daytime Lighting of Catenary Support Structures

Where a support structure or a power line crossing are assessed by the Minister, as a result of an Aeronautical Evaluation, as likely to be inadequately marked by the painting and markers specified in Chapter 10, the support structure is lighted in daytime by medium or high intensity white flashing light units as follows:

Support Structures 150 m AGL or less

(a) One of the following lighting systems is approved by the Minister as part of the Aeronautical Evaluation for the catenary, where no portion of the obstruction exceeds 150 m AGL:

- (i) a CL-866 medium intensity white flashing white lighting system, or
- (ii) a CL-866/CL-885 dual medium intensity flashing lighting system.

Support Structures exceeding 150 m AGL

(b) One of the following lighting systems is used for the catenary, where the obstruction exceeds 150 m AGL:

- (i) a CL-857 high intensity white flashing lighting system, or
- (ii) a CL-857/CL-855 dual high intensity flashing lighting system.

Levels of Light Units

(c) The lighting system includes light levels displayed as follows:

(i) a system of three levels of sequentially flashing light units is installed on each supporting structure or adjacent terrain as follows:

(A) at the top of the structure,

(B) at the lowest point in the catenary, and

(C) approximately midway between the other two light levels and at least 15 m from the other two levels, except that the middle light level may be deleted when the distance between the top and the bottom light levels is less than 30 m,

(ii) the maximum vertical spacing tolerance allowed to accommodate structural limitations is 20 percent of the uniform spacing of the bottom and middle light units, and

(iii) if the base of the supporting structure is higher than the lowest point in the catenary, such as a canyon crossing, the required light units are installed on the adjacent terrain at the level of the lowest point in the catenary.

Light Coverage

(d) The photometric coverage requirements for the light units are:

(i) in the case of the top level of light units:

(A) one or more lights are installed, subject to clause (B), at the top of the structure to provide 360-degree coverage ensuring an unobstructed view to a pilot from any normal angle of approach,

(B) if the installation presents a potential danger to maintenance personnel, or when necessary for lightning protection, the top level of light units may be mounted not more than 6 m below the highest point of the structure, provided that due consideration is given to the overall obstacle avoidance distances referred to in section 2.1, and

(ii) in the case of the middle and bottom levels of light units:

(A) the light units at the middle level and bottom level are installed so as to provide a minimum of 180-degree coverage cantered perpendicular to the flyway,

(B) where a catenary crossing is situated near a bend in a river, canyon or similar geographical feature, or where it is not perpendicular to the flyway, the horizontal beam is directed to provide the most effective light coverage to warn pilots approaching the catenary wires from any normal angle of approach, and

(C) where a catenary involves three or more supporting structures, the inner structure or structures are equipped with enough light units per level to provide 360-degree coverage.

Flash Sequence

(e) The lighting system flashes as follows:

- (i) each light unit has a flash frequency of 60 flashes per minute or 1 second per flash cycle (± 5 percent),
- (ii) the flash sequence of the levels of light units is middle, top, and then bottom,
- (iii) the interval between top and bottom flashes is about twice the interval between middle and top flashes, and
- (iv) the interval between the end of one sequence and the beginning of the next is about 10 times the interval between middle and top flashes.

Synchronization

(f) On the lighting system used for associated catenary support structures:

- (i) the corresponding light levels flash simultaneously, if practicable, and
- (ii) where three or more supporting structures are involved and the inner structure or structures are equipped with enough light units per level to provide 360-degree coverage, the light units for each level flash simultaneously.

Photocell Control

(g) Where a medium or high intensity lighting system is used for a catenary crossing, the light intensity of the system is automatically controlled by photocell devices whose day, twilight and night transition settings conform to the specifications set out in Table 13-1.

Photometric Characteristics

(h) The photometric characteristics of the lighting system are in accordance with the requirements set out in Chapter 13.

10.8 *Lighting with use of ADS*

Where an Aircraft Detection System (ADS) is installed as specified in Chapter 15, each support structure is lighted by one of the following medium intensity lighting systems as illustrated in Figure 10-2b:

- (a) a CL-866 medium intensity white flashing white lighting system, or
- (b) a CL-866/CL-885 dual medium intensity flashing lighting system.

CHAPTER 11 MARKING AND LIGHTING OF MOORED BALLOONS AND KITES

11.1 *Scope*

Chapter 11 governs the marking and lighting of moored balloons and kites.

11.2 *Application*

A balloon that is 1.8 m or more in diameter or exceeds 3 cubic meters of gas capacity, or a kite weighing more than 2.27 kg are marked and lighted in accordance with the requirements specified in Chapter 11.

11.3 *Markers*

Markers are attached, during daytime, to the mooring lines of a balloon or to the tether cable of a kite in accordance with this section.

(1) Location

Markers are displayed at not more than 15 m intervals along the mooring lines of the balloon or the tether cable of the kite, beginning at 45 m from the point of attachment on the ground.

(2) Characteristics

Markers required under subsection (1) are:

- (a) rectangular in shape, 0.15 m wide and 3.0 m in length; and
- (b) of the following colour patterns:
 - (i) solid orange, or
 - (ii) of two triangular sections, one of aviation orange and the other aviation white, combined to form a rectangle.

11.4 Lighting

At night, a moored balloon or a kite is equipped with the lighting devices specified in this section.

(1) Location

(a) Lights having the characteristics specified in subsection (2) are located on the top of the object in a fashion as to be viewable from all directions, except that where the dimensions of the object are in excess of 45 m, additional lights of the same type are installed on the top, nose section, tail section, and on the mooring lines or tether cable approximately 5 m below the balloon or kite, so as to define its shape and size; and

(b) Additional lights are equally spaced along the mooring line or tether cable for each 107 m, or fraction thereof, commencing at 90 m AGL.

(2) Characteristics

(a) For operations from 90 m AGL to 150 m AGL, red flashing or white flashing lights of 32.5 effective candelas are installed on the moored balloon and on its mooring lines, or on the tether cable of the kite.

(b) For operations above 150 m AGL, white flashes of 500 effective candela are installed on the moored balloon and on its mooring line, or on the tether cable of a kite.

(3) Control

Lighting required on a moored balloon or on a kite is provided with a means of control such as, for instance a photocell, for day and night time operation in accordance with Table 13-1.

CHAPTER 12 WIND TURBINES AND WIND FARMS

12.1 Scope

Chapter 12 governs the marking and lighting of a wind turbine and a wind turbine farm.

Information Note 1: *The definition of wind farm is based on the premise that the installation of three wind turbines is the first instance for which omission of lighting might be made. Since the exterior wind turbines [on the perimeter] of a wind farm are to be lighted, a grouping of only two wind turbines would require that both be lighted. In the case of three wind turbines lighting of the inner wind turbine may be omitted depending upon spacing.*

Information Note 2: *The application of these requirements can vary in accordance with the provisions of this Standard depending on terrain features, geographic location, overall layout of the structures, and normal angles of approach.*

Information Note 3: *The provision of lighting on wind turbines and wind farms should be done in a fashion as to minimize the possibility of bird fatalities and interference with nighttime astronomical study.*

12.2 Wind turbines of Total Height Equal to or Less than 150 m

(1) Marking Requirements

For the purpose of Day Protection, a single wind turbine and wind turbines of a wind farm are painted a white or an off-white colour.

Information Note: *The above specified colours can be found in the RAL colour system as ...*
white - #9010

off-white - #7035 (light grey)

(2) Lighting Requirements

For Night Protection, a single wind turbine and wind turbines of a wind farm are lighted as illustrated in Figure 12-1 and as follows:

(a) For a single wind turbine,

- (i) A wind turbine is lighted with use of a CL-864 medium intensity red flashing beacon for nighttime hours.
- (ii) The lighting fixtures required under subparagraph (i) are mounted to ensure an unobstructed view by a pilot approaching from all angles of aircraft approach.

(b) For a wind farm;

- (i) The group of wind turbines composing a wind farm is indicated to pilots by installation of CL-864 medium intensity red flashing beacons on specified wind turbines on the perimeter of the wind farm.
- (ii) The "wind farm indicators" of subparagraph (i) are located so as to define the wind farm and spaced at a horizontal distance in the order of 900 m for given directions of aircraft approach.
- (iii) In addition to the wind farm indicators of subparagraph (ii) the dominant [highest in absolute height] wind turbine within the wind farm is also required to be lighted. This requirement for lighting is dependent upon the degree of dominance deemed to produce a hazard to air navigation.
- (iv) A tower or other structure within the wind farm, which in being lighted provides the same level of safety, may be used for installation of a wind farm indicator.

(v) Because of the variation in configuration of wind farms, the provision of lighting is also subject to a risk assessment taking into account such factors as the general profile of the group, the location of the wind farm in relation to nearby aerodromes or recognized VFR flight routes, and the anticipated air traffic.

(vi) All indicator lighting provided for a wind farm flashes simultaneously.

12.3 Wind turbines of Total Height Exceeding 150 m

The provision of marking and lighting for wind turbines higher than 150 m is determined through means of a risk assessment.

12.4 Continued Illumination

The lighting provided for a wind turbine or wind farm is so designed such that it can draw power from the electrical grid for continued illumination even though the wind turbine on which it is mounted ceases operation.

Information Note: The above standard is based upon the premise that the lighting of a non-operating wind turbine can obtain power from the grid. However, it also recognizes that continued illumination will not be possible should the electrical grid itself fail.

CHAPTER 13 OBSTRUCTION LIGHTING CHARACTERISTICS

13.1 Scope

Chapter 13 governs the overall technical characteristics of obstruction lighting equipment required under this Standard.

13.2 Equipment Specification

The specifications covering electrotechnical requirements of obstruction lighting equipment are contained in Appendix B.

13.3 Photometrics

The photometric output of obstruction light units required under this Standard is in accordance with Table 13-2. Table 13-1 provides an illustration of these photometric requirements.

13.4 Photocell Control

In order to have automatic control of obstruction lighting systems, these are provided with a photocell device with settings as shown in Table 13-1.

Table 13-1: Photocell Control Settings

Operational transition occurs from – to		at a north sky illuminance of
day	twilight	600 to 350 lux
twilight	Night	350 to 20 lux
night	twilight	20 to 350 lux
twilight	Day	350 to 600 lux

Table 13-2: Obstruction Light Photometric Distribution

Light Type	Colour	Signal type	Minimum Intensity (candelas) (a)(g)			Vert. beam spread (b)	Intensity (candelas) at given elevation angles when the light is levelled (c)				
			day	twilight	night		- 10° (d)	- 1° (e)	± 0° (e)	+ 2.5°	+ 12.5°
CL810	red	fixed	N/A	32	32	10°	-----	-----	-----	32 min	32 min
CL864	red	20-40 fpm	N/A	N/A	2000	3° min	-----	50% min 75% max	100% min	-----	-----
CL865 (f)	white (f)	40 fpm	20,000	20,000	2000	3° min	3% max	50% min 75% max	100% min	-----	-----
CL866	white	60 fpm	20,000	20,000	2000	3° min	3% max	50% min 75% max	100% min	-----	-----
CL885	red	60 fpm	N/A	N/A	2000	3° min	-----	50% min 75% max	100% min	-----	-----
CL856	white	40 fpm	270,000	20,000	2000	3° min	3% max	50% min 75% max	100% min	-----	-----
CL857	white	60 fpm	140,000	20,000	2000	3° min	3% max	50% min 75% max	100% min	-----	-----

(a) Effective intensity, as determined in accordance with Appendix B.

(b) Beam spread is defined as the angle between two directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the intensity shown in columns 4, 5 and 6. The beam pattern is not necessarily symmetrical about the elevation angle at which the peak intensity occurs.

(c) Elevation (vertical) angles are referenced to the horizontal.

(d) Intensity at any specified horizontal radial as a percentage of the actual peak intensity at the same radial when operated at each of the intensities shown in columns 4, 5 and 6.

(e) Intensity at any specified horizontal radial as a factor of the lower tolerance value of the intensity shown in columns 4, 5 and 6.

(f) In the case of rotating type CL-865, one-third of the flash display is red in colour. e.g. WWRWWR

(g) For flashing lights a tolerance on the nominal of $\pm 25\%$.

CHAPTER 14 MAINTENANCE

14.1 Scope

Chapter 14 governs the maintenance of marking and lighting required under this Standard.

14.2 Marking

The surfaces of a building, structure or object required to be marked with paint, are repainted when the colour changes noticeably or when its effectiveness is reduced by scaling, oxidization, chipping or layers of contamination.

***Information Note:** In-Service Aviation Orange Colour Tolerance Charts are available from private suppliers for determining when repainting is required. The colour should be sampled on the upper half of the structure, since weathering is greater there.*

14.3 Lighting

(1) Operating Voltage

To ensure proper candela output:

- (a) for light units with incandescent lamps, the voltage provided to the lamp socket shall be within ± 3 percent of the rated voltage of the lamp; or
- (b) for light units with strobe [capacitor discharge] lamps, the input voltage to the power supply shall be within ± 10 percent of rated voltage of the power supply.

(2) Lamp Replacement

- (a) A lamp in a light unit is replaced immediately upon failure or after being operated for not more than 75 percent of its rated life.
- (b) A flashtube in a light unit is replaced:
 - (i) immediately upon failure, or
 - (ii) when the peak effective intensity falls below specification limits, when the fixture begins skipping flashes or at the manufacturer's recommended intervals, whichever occurs first.

(3) Fixture Lenses

Owing to the effects of harsh environments, a beacon lense is visually inspected for ultraviolet damage, cracks, crazing, dirt build up or similar forms of degradation, to ensure that the required certified light output has not been adversely affected.

14.4 Removal of Obscuring Effects

Regular inspection takes place and remedial action undertaken to ensure that effects, such as the growth of vegetation, do not obscure the pilot's view of any portion of marking or lighting displayed pursuant to this Standard.

CHAPTER 15 AIRCRAFT DETECTION SYSTEM (ADS)

15.1 Scope

Chapter 15 governs Aircraft Detection Systems (ADS) which are used to turn on obstruction lighting systems upon detection of an approaching aircraft. The system is radar based and can detect and analyze the flight path [position, altitude, heading and ground speed] of an aircraft so as to determine the possibility of potential collision with an object. If the flight path is such that the aircraft may impact the obstacle, then the obstacle lights are turned on and a later audio signal is transmitted. The purpose of the system is to enable the lighting to be off when not needed [absence of aircraft] and thereby to reduce energy consumption, and glare to the public.

15.2 Impact Boundary

(1) The impact boundary is a 3-dimensional boundary around the obstacle approved by the Minister, so as to establish the distance [in terms of seconds] from the location of the detected aircraft to a point of impact on this boundary.

(2) The impact boundary is at a distance of 60 m to 300 m from the actual physical sides of the obstacle, as shown in Figure 15-1.

Note: An impact boundary for a catenary is shown in Figure 15-1. Different shapes of impact boundary may be required for different obstacles. In the case of lengthy or large area objects, more than one ADS radar may be required.

(3) In vertical dimension, the impact boundary extends 60 m above the highest portion of the obstacle.

15.3 Operation

(1) The system has two primary functions: to turn on the obstacle lights and to emit an audio signal. These functions are performed with respect to the detection of the aircraft within a specified minimum flight time to the impact boundary for both a heading directly towards the impact boundary as well as a potential manoeuvre towards the impact boundary.

(2) The system has the following minimum timings for light and audio signal activation with respect to the speed of the aircraft and time from the impact boundary:

Aircraft speed knots	Aircraft speed m/s	Time from Impact Boundary (seconds)
90	46.3	30
120	61.7	30
165	84.9	30
180	92.6	30
250	128.6	20

(3) Potential Manoeuvre to Impact Boundary

Note: The following addresses the case of aircraft that are not on a direct flight path to impact, but have the potential for impact.

(a) The ADS detects and causes light and audio signal activation per 15.3.2 for aircraft flying in the horizontal plane that would have a potential of impact if it were to conduct a turning manoeuvre of up to 2g. Refer to Figure 15-3.

(b) The ADS detects and causes light and audio signal activation per 15.3.2 for aircraft flying in the horizontal plane that would have a potential of impact if it were to conduct a descent of rate of up to 2.5m/s [500 ft per minute]. Refer to Figure 15-3.

(4) Lighting

(a) Once the lighting is activated upon aircraft detection, the lighting is maintained on for a period of at least 60 seconds.

(b) The lighting for use with ADS is of a design such that it will provide full intensity within 2 seconds of activation.

(5) Audio Signal

(a) The audio signal consists of a 3 note chime followed by a worded message indicating the type of obstacle as determined locally. For example, for a catenary crossing, the term "power line" may be used. The signal is repeated a total of 6 times for slow speed aircraft and 3 times for high speed aircraft [>250 knots], for a total duration of 12 seconds and 6 seconds respectively.

(b) The audio signal is limited in range so as to not interfere with other non-ADS broadcasts. The limitation of range is tested using standard General Aviation VHF radio and antenna equipment while the ADS VHF transmitter is transmitting a continuous test signal, range limit is where the perceived signal quality comes below level 4.

Note 1: A limited range represented by a volume of space defined by a cylinder centred on the ADS unit with a radius of 7 km and height of 1.8 km, is recommended.

Note 2: In the radio terminology, the quality of the radio signal is rated on a scale from 1 through 5, where 1 is the worst (unreadable) and 5 is best. A quality of 4 is fully readable, when below 4 the audio signal is degraded below an acceptable level.

(c) The audio signal is broadcast simultaneously on multiple frequencies in the VHF band over the range of 118 to 136 MHz. The frequencies are selected as appropriate for local requirements.

(6) Warning Zones

Note: The ADS may be considered to establish "warning zones" around the obstacle based upon the timings for light activation and audio signal transmission in relation to the impact boundary.

(a) If the aircraft enters the audio signal warning zone, an audio signal is transmitted. If the aircraft remains within this zone no additional audio signals are provided. A new signal will be provided, if the aircraft leaves the zone and then re-enters.

(b) If the aircraft enters the light activation warning zone, the lights are turned on and will continue to be illuminated for the period specified in subsection 15.3.4. If the aircraft remains within this zone beyond the specified period, the lights will turn off. The lights will be re-activated, when the aircraft leaves the zone and then re-enters.

(7) Frequencies

(a) Audio signal radio broadcasts comply with applicable Industry Canada guidelines and permit requirements.

(b) The radar frequencies are selected so as to not cause interference with other radar operations.

15.4 Monitoring

The ADS has continuous electronic monitoring to detect failure of the major components.

(a) Radar or Communications Failure: The occurrence of failure of the radar or of the communication link to the lights cause the lighting to be turned on continuously, the audio signal deactivated and an alarm given to a 24 hour staffed station. There is provision for immediate issuance of a NOTAM from this station. The communication status and operational status of the system are confirmed at least once every 24 hours.

(b) Obstruction Lights Failure: If a light outage occurs, the audio warning function remains active, the monitoring station is notified and a NOTAM issued. Corrective action is taken as soon as possible to restore the light.

15.5 Self Test

Unless the system has been activated at least once within a 24 hour period by aircraft, the system is activated for self test at least once within a 24 hour interval to verify the operational status.

15.6 Radar Unit

The radar unit is provided with a battery backup supply having a capacity for 24 hours of operation, to enable communication of external power supply failure to the lights.

15.7 Submission of Application for Use

The design and function of each control device is described in the ADS application. The control device description includes: functionality, selectable features, program modification, maintenance actions, failure/monitoring provisions and any reporting functions. The reportable functions are described and the methodology detailed for accumulating information.

15.8 Commissioning Test

The ADS installation is subject to a commissioning test to verify:

- (a) the required performance of the system,
- (b) absence of any interferences of the radar unit with other radars in the area, and
- (c) that the audio does not present a hazard to other aircraft communications not in proximity to the obstruction hazard.

APPENDIX A

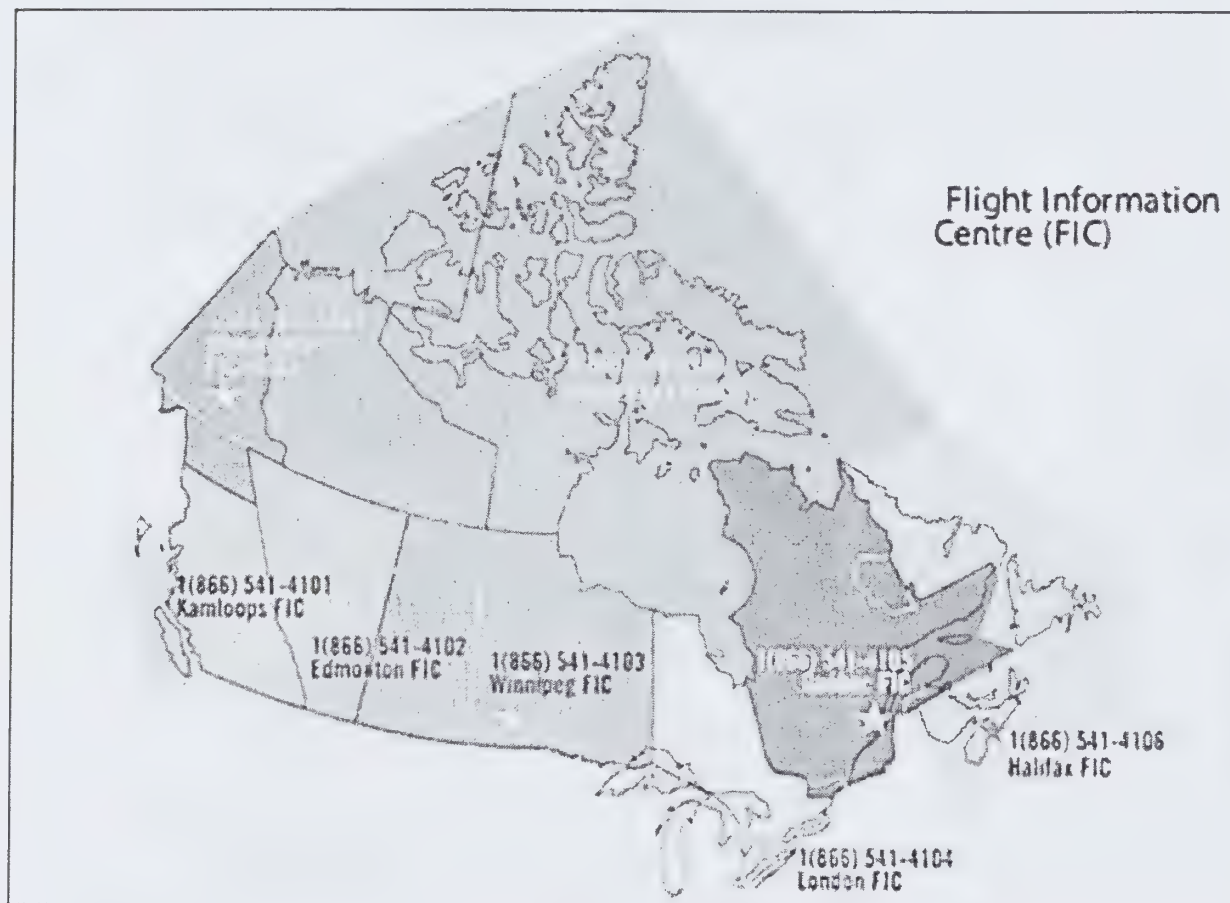
TRANSPORT CANADA CIVIL AVIATION REGIONS

AERODROMES AND AIR NAVIGATION

Region	Address	Telephone
Pacific	Transport Canada Suite 620, 800 Burrard St. Vancouver, British Columbia V6Z 2J8	(604) 666-8777 e-mail: pacaocf@tc.gc.ca
Prairie and Northern for Alberta, Saskatchewan, Manitoba, Yukon, Nunavut, and NWT	Transport Canada 1100, 9700 Jasper Avenue Edmonton, Alberta T5J 4E6	(780) 495-3850 e-mail: kim.davis@tc.gc.ca
Ontario	Transport Canada 4900 Yonge Street, 4 th Floor Toronto, Ontario M2N 6A5	(416) 952-0215 or 1-877-231-2330 e-mail: CASO-SACO@tc.gc.ca
Quebec	Transport Canada 700 Leigh Capréol Dorval, Quebec H4Y 1G7	(514) 633-3252 e-mail: aerodromes.quebec@tc.gc.ca
Atlantic for Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland and Labrador	Transport Canada P.O. Box 42 Moncton, New Brunswick E1C 8K6	1-800-387-4999 e-mail: caso-saca@tc.gc.ca

NAV CANADA

If there is a failure of obstacle lighting and it is to be reported through means of a NOTAM, one should contact the NAV CANADA Flight Information Centre in which the object is located.



Source NAV CANADA <http://www.navcanada.ca/>

Kamloops	1-866-541-4101	Quebec	1-866-541-4105
Edmonton	1-866-541-4102	Halifax	1-866-541-4106
Winnipeg	1-866-541-4103	Whitehorse	1-866-541-4107
London	1-866-541-4104	North Bay	1-866-541-4109

APPENDIX B

SPECIFICATION FOR OBSTRUCTION LIGHTING EQUIPMENT

1.0 INTRODUCTION

1.1 Scope

This specification sets forth design and qualification test criteria for obstruction lighting equipment used to increase conspicuity of structures to permit early obstruction recognition by pilots.

1.2 Equipment Classification

Light	Intensity type	colour	Flash rate	Flash Cycle Duration
CL-810	low	red	steady burning	n/a
CL-856	high	white	40fpm	1500ms
CL-857	high	white	60fpm	1000ms
CL-864	medium	red	20 to 40fpm	3000 to 1500ms
CL-865	medium	white	40fpm	1500ms
CL-866	medium	white	60fpm	1000ms
CL-885	medium	red	60fpm	1000ms

fpm = flashes per minute

2.0 REFERENCE DOCUMENTS

2.1 General

It is intended that the following reference documents be used in conjunction with this document:

2.2 Transport Canada

Standard 621 - Obstruction Marking and Lighting

2.3 Federal Aviation Administration (FAA) Advisory Circulars (ACs)

AC 70/7460-1 Obstruction Marking and Lighting

AC 150/5345-43f Specification for Obstruction Lighting Equipment

Note: The above FAA circulars are referenced for reason of a linkage with respect to the basis of this specification. However, the reader is cautioned that some of the requirements contained in K-310 differ from that in the FAA circulars.

2.4 Military Standards and Specifications

MIL-STD-810F Environmental Engineering Considerations and Laboratory Tests

MIL-C-7989 Cover, Light-Transmitting, for Aeronautical Lights, General Specification for

2.5 Institute of Electrical and Electronics Engineers (IEEE) Publications

IEEE C62.41-1991 IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits

IEEE C62.45 IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits

2.6 Illuminating Engineering Society (IES) Publications

IES Handbook — Reference and Application Volume, 8th Edition, 1993, Flashing Light Signals, pp. 96-97

2.7 International Civil Aviation Organization (ICAO)

Annex 14 Volume 1, Aerodrome Design and Operations

2.8 Document Sources

Copies of military standards and specifications may be obtained from:

DAPS/DODSSP
Building 4, Section D
700 Robbins Avenue
Philadelphia, PA 19111-5094

Tel: (215) 697-2179

Website: dodssp.daps.dla.mil

Copies of IEEE standards may be obtained from:

IEEE Customer Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331

Tel: (800) 678-4333

email: storehelp@ieee.org

website: shop.ieee.org/ieeestore

Copies of IES of North America (IESNA) documents may be obtained from:

website: www.techstreet.com

or

website: www.iesna.org/shop/

Copies of ICAO documents may be obtained from:

ICAO, Document Sales Unit
999 University Street
Montreal, Quebec, Canada H3C 5H7

Tel: (514) 954-8022

email: sales@icao.int

website: www.icao.int

3.0 EQUIPMENT REQUIREMENTS

3.1 General

This section addresses environmental, design, and photometric requirements for obstruction light equipment. Criteria for selecting the proper obstruction lighting equipment, installation tolerances, and administrative information are in Standard 621, *Obstruction Marking and Lighting*.

3.2 Environmental Requirements

Obstruction lighting equipment is designed for continuous operation under the following conditions:

(a) Temperature:

Storage/shipping: -55 degrees Celsius to +55 degrees Celsius

Operating: -40 degrees Celsius to +55 degrees Celsius

(b) Humidity. 95 percent relative humidity.

(c) Wind. Wind speeds up to 240 kilometres per hour.

(d) Wind-blown Rain. Exposure to wind-blown rain from any direction.

(e) Salt Fog. Exposure to salt-laden atmosphere.

(f) Sunshine. Exposure to solar radiation.

3.3 Design Requirements

3.3.1 Light Unit

Materials used within the light unit are selected for compatibility with their environment. All plastic lens parts (including gaskets), that are exposed to ultraviolet radiation or ozone gas do not change colour, crack, check, disintegrate, or be otherwise degraded (photometry remains compliant). Each light unit is an independent unit and flashes at the specified intensity or at its highest intensity when control signals are absent.

3.3.2 Light Covers

Light-transmitting covers for light units are per the requirements in MIL-C-7989. In addition, if plastic covers are used, they are resistant to checking, crazing, or colour changes caused by ultraviolet radiation or ozone gas exposure.

3.3.3 Light Colours

The aviation red is per ICAO Annex 14, Volume 1, Appendix 1, *Colours for Aeronautical Ground Lights*, at operating temperature within the following chromaticity boundaries for the colour red:

purple boundary	$y = 0.980 - x$
yellow boundary	$y = 0.335$
	$x + y + z = 1$

Xenon flashtube emission or a colour temperature range from 4,000 to 8,000 degrees Kelvin is acceptable for white obstruction lights.

3.3.3.1 Light Colour During Daytime

CL-810 obstruction lights do not require a non-powered colour during daytime viewing.

3.3.4 Aiming (for CL-856 and CL-857)

Light units have a method for adjustment of the vertical aiming angle between 0 and +8 degrees. A spirit level or other device is provided as part of each light unit for setting the vertical aiming angle of the light beam with an accuracy of \pm degree.

3.3.5 Control Unit

3.3.5.1 White Flashing Obstruction Lighting Systems

The control unit shall set the system's flash rate, intensity and sequence and shall be capable of controlling light units up to a distance of 762 m. If the control unit or control wiring fails, the light units continue to flash at the flash rate indicated in Table 1. Failure of an intensity step change circuit shall cause all light units to remain operating at their proper intensity or alternatively to operate at the high intensity step.

3.3.5.1.1 Monitoring. Each light unit is monitored for FLASH/FAIL status. FAIL status is defined as either of the following conditions: unit misses four or more consecutive flashes; unit flashes at wrong intensity step during day operation or failure of the continuous movement of the rotating device for rotating type flashing lights. Monitoring is fail safe (i.e. active signals for FLASH and absence of signals for FAIL). There is a provision to permit connection to a remote alarm device (supplied by others or as an option) to indicate the system and individual light unit FLASH/FAIL status.

3.3.5.1.2 In addition to the above, the control unit displays the status of each light unit. An intensity control override switch is also mounted in the enclosure to manually control light intensity during maintenance or in the event of a photoelectric control malfunction.

3.3.5.2 Red Flashing Obstruction Lighting Systems

The control unit sets the system flash rate and flash sequence. Failure of the flashing circuit causes the light units to energize and operate as steady burning lights.

An override switch is mounted on the control unit to manually control the lights during maintenance or in the event of a lack of a photoelectric control signal.

To ensure proper operation, all flashing red obstruction lights, inclusive of any associated system steady burning red lights, are certified with a control unit whether internal or external to the lighting unit.

3.3.5.2.1 Dual Lighting Systems

The control unit may be a separate unit or incorporated as part of either the white or red obstruction light control unit.

The control unit sets the operating mode for each light unit in the system. Outage of one of two lamps, or any failure in the device that causes a reduction in intensity of the horizontal beam or results in an outage in the uppermost red beacon (CL-864 unit) or outage of any uppermost red strobe, cause the white obstruction light system to operate in its specified "night" step intensity.

At no time should both red and white systems be on simultaneously.

***Note:** This does not apply to a rotating type CL-865 which produces a WWRWWR signal. W = White; R = Red.*

An override switch is mounted on the control unit to manually control the operating mode of the system during maintenance or in the event of a lack of a photoelectric control signal.

3.3.5.2.2 Monitoring

Each separate CL-864 light unit and each tier of CL-810 light units is monitored for FLASH/FAIL status.

"FAIL" is defined as outage of any lamp in a CL-864 light unit, outage of any one lamp in a tier of CL-810 light units, or failure of a flasher (steady on and/or total) for a CL-864 light unit. Monitor signals are fail safe (i.e., active signals for FLASH and absence of signals for FAIL).

There is a provision to permit connection to a remote alarm device, (supplied by others or by the light manufacturer) to indicate FLASH/FAIL status.

3.3.6 Input Voltage

The obstruction lighting equipment is designed to operate from the specified input voltage ± 10 percent.

Incandescent lamps are operated to within ± 3 percent of the rated lamp voltage to provide proper light output.

3.3.7 Radiated Emissions

Note: Optional only. No equipment qualification is required.

Obstruction lighting that uses electronic circuitry to power the light source is classified as an incidental radiator. This applies to equipment that does not intentionally generate any radio frequency energy, but may create such energy as an incidental part of its intended operations.

Obstruction light systems employ sound engineering practices to minimize the risk of harmful interference.

3.3.8 Optional Arctic Kit

Light systems may be offered with an optional arctic kit to enable operation in temperatures below -40 degrees Celsius.

3.4 Performance Requirements

3.4.1 Photometric

The light units meet or exceed the minimum photometric requirements found in Standard 621. The values specified in Standard 621 are minimums and relate to minimum acquisition distances. The tolerance of ± 25 percent is a tolerance on meeting the nominal intensity value.

The effective intensity for flashing lights is calculated per Formula (1) by the method described for *Flashing Light Signals* in the IES Handbook, 1993 Reference and Application Volume, 8th Edition, Pages 96 and 97:

$$I_e = \left(\int_{t_1}^{t_2} I dt \right) / (0.2 + (t_2 - t_1))$$

Where:

I_e = Effective intensity (Candela)

I = Instantaneous intensity (Candela)

t_1, t_2 = Times in seconds of the beginning and end of that part of the flash when the value of I exceeds I_e . This choice of the times maximizes the value of I_e .

For discharge type flashing lights, the equipment provides the specified light output at the specified temperature extremes as the input voltage simultaneously varies by ± 10 percent from nominal. The light intensity and beam distribution requirements for obstruction lighting equipment are specified in Chapter 13. All intensities listed are effective intensities (except steady-burning red obstruction lights) measured at the flash rate specified in Table 1. All incandescent lights will be tested as steady burning lights.

The frequency of the pulses is not less than 50 Hz and the interval $t_A - t_1$ does not vary by more than $\pm 5\%$ from the nominal value from pulse to pulse over the simultaneous extremes of temperature and input voltage.

The effective intensity for flashing lights is calculated per the following formula by the method described for *Flashing Light Signals* in the IES Handbook, 1993 Reference and Application Volume, 8th Edition, Pages 96 and 97:

$$I_e = \frac{\left(\int_{t_1}^{t_2} I dt \right)}{(0.2 + (t_n - t_1))}$$

Where:

I_e = Effective intensity (Candela)

I = Instantaneous intensity (Candela)

t_1, t_2 = Times in seconds of the beginning and end of the first pulse flash when the value of I exceeds I_e . This choice of the times maximizes the value of I_e .

The effective intensity for multiple pulse flashes as used in strobe lights is calculated by:

$$I_e = \frac{\left(\int_{t_1}^{t_2} I dt + \int_{t_3}^{t_4} I dt + \int_{t_5}^{t_6} I dt + \dots + \int_{t_{n-1}}^{t_n} I dt \right)}{(0.2 + (t_n - t_1))}$$

Where:

I_e = Effective intensity (Candela)

I = Instantaneous intensity (Candela)

t_1, t_2 = Times in seconds of the beginning and end of the first pulse flash when the value of I exceeds I_e . This choice of the times maximizes the value of I_e .

t_3, t_4 = Times in seconds of the beginning and end of the second pulse flash when the value of I exceeds I_e . This choice of the times maximizes the value of I_e .

t_{n-1}, t_n = Times in seconds of the beginning and end of the last pulse flash when the value of I exceeds I_e . This choice of the times maximizes the value of I_e .

3.4.2 Flash Duration

Flash characteristics are defined in Table 1.

Table 1: Flash Duration

Type	Intensity	Intensity Step	Flash Rate ⁽¹⁾	Flash Duration ⁽²⁾
CL-856	high	day & twilight	40fpm	less than 200ms
		night	40fpm	between 100 and 250ms
CL-857	high	day & twilight	60fpm	less than 200ms
		night	60fpm	between 100 and 250ms
CL-864	medium	night	20-40fpm	1/2 to 2/3 of flash period if incandescent lighting (note 3), and between 100 and 2/3 of flash cycle if other light source.
CL-865	medium	day & twilight	40fpm	less than 200ms
		night	40fpm	between 100 and 2/3 of the flash cycle
CL-866	medium	day & twilight	60fpm	less than 200ms
		night	60fpm	between 100 and 2/3 of the flash cycle
CL-885	medium	night	60fpm	1/2 to 2/3 of flash period if incandescent lighting (note 3), and between 100 and 2/3 of the flash cycle if other light source.

fpm = flashes per minute

ms = microseconds

NOTES:

- (1) Flash rates have a tolerance of ± 5 percent.*
- (2) When the effective flash duration is achieved by a group of short flashes, the short flashes are emitted at a rate of not less than 50 Hz.*
- (3) The light intensity during the "off" period is less than 10 percent of the peak effective intensity. The "off" period is at least 1/3 of the flash period.*

3.4.3 System Flashing Requirements**3.4.3.1 Simultaneous Flashing Systems**

All obstruction lights in systems composed of either CL-864 light units or CL-856 and/or CL-865 light units flash within 1/60 of a second of each other.

3.4.3.2 Sequenced Flashing Systems

- (a) Catenary support structure systems composed of CL-857, CL-866, or CL-885 light units have a sequenced flashing characteristic.*
- (b) This system consists of three lighting levels on or near each supporting structure. One light level is near the top, one at the bottom or lowest point of the catenary, and one midway between the top and bottom.*
- (c) The flash sequence is middle, top, and bottom.*
- (d) The interval between top and bottom flashes is about twice the interval between middle and top flashes.*
- (e) The interval between the end of one sequence and the beginning of the next is about 10 times the interval between middle and top flashes.*
- (f) The time for the completion of one cycle is one second (± 5 percent).*

3.4.4 Intensity Step Changing**3.4.4.1 White Obstruction Lights**

Refer Standard 621 for photocell settings for day, twilight and night operation.

3.4.4.2 Red Obstruction Lights

Refer Standard 621 for photocell settings for night operation.

4.0 EQUIPMENT QUALIFICATION REQUIREMENTS

4.1 Qualification Tests - General

Qualification tests are conducted on the light unit in the following order:

- (a) Initial photometric test, per section 4.2;
- (b) Environmental tests, per sections 4.3, 4.4, 4.5, 4.6, 4.7, 4.8 and 4.9 (in any order);
- (c) 1000 hours of continuous operation, per section 4.10;
- (d) System Operational Test, per section 4.10; and
- (e) Sampling Photometric Test, per section 4.2.

Sample photometric and system operational tests are conducted after completion of all environmental tests. The same unit(s) is used throughout the tests. The following tests are required to demonstrate compliance with this specification. The tests may be run on the control unit, power supply, and a single light unit, with a simulated load replacing the other light units. Equipment is tested as a complete system.

4.2 Photometric Test

A full photometric test as described in this section is performed before all environmental tests.

NOTE: *To verify proper colour correction, photometric testing conducted on alternative light source fixtures is done with a detector having an up to date calibration including spectral response data.*

A sampling photometric retest is conducted after the unit has been operated continuously for 1000 hours with normal (12 hour) day/night cycling. This sampling consists of measuring the vertical beam pattern for compliance with photometric requirements at a minimum of two of the previously tested horizontal radials.

Light units are energized by the system power supply and control unit, and are tested for compliance with photometric requirements.

Incandescent lamps are tested at ± 3 percent of their nominal voltage.

Red light intensity may be measured in white light and then calculated if the glassware manufacturer certifies the chromaticity and transmissivity values of the red filter material for the particular source. If more than one lamp type is to be used, the qualification testing is completed for each lamp type.

For a discharge type flashing system, if the power supply and optical head are separate components, the manufacturer demonstrates that the required photometrics are produced with the units separated by maximum and minimum recommended distances and connected by cable recommended by the manufacturer.

Photometric test results are in the forms of:

- (a) points over range of specified angles; and
- (b) Horizontal beam pattern: Polar plot (horizontal angle versus candela) with a minimum 30 degree spacing of test points.

4.3 High Temperature Test

The high temperature test is conducted per MIL-STD-810F, Method 501.4, Procedure II. The equipment is subjected to a constant temperature of +55 degrees Celsius for 4 hours after equipment temperature stabilization and be operated throughout the test.

NOTE: For steady state temperature testing, consider thermal stabilization to be achieved when the temperatures of critical internal operating components are relatively constant. (Because of test item duty cycling or the operating characteristics, a constant temperature may never be achieved.)

During the test, the manufacturer demonstrates that the equipment maintains the specified flash rate and (for discharge type flashing light) the proper amount of energy is being delivered to the flashtube as the input voltage is varied by ± 10 percent from nominal.

A visual examination is conducted after the equipment is removed from the chamber. Failure of the equipment to operate as specified is cause for rejection.

4.4 Low Temperature Test

The low temperature test is conducted per MIL-STD-810F, Method 502.4, Procedure II. The equipment is placed in a chamber that maintains a temperature of -55 degrees Celsius for shipping/storage requirements and -40 degrees Celsius for equipment operational requirements.

Equipment operation is demonstrated at the beginning of the test.

The equipment storage and shipping low temperature requirement is -55 degrees Celsius. The equipment is stabilized and cold soaked at the storage/shipping temperature for one hour. The test chamber is then ramped to the -40 degrees Celsius equipment operating temperature at no more than 14.4 degrees Celsius per minute to prevent thermal shock to the equipment.

The equipment, with input power off, is then exposed to a 24-hour soaking period at -40 degrees Celsius after which the equipment is turned on for one hour, and operates normally. The unit achieves specified flash rate and intensity within 1 minute after being energized. For rotating type beacons having HID (high intensity discharge) lamps and intended for continuous operation once installed, the unit achieves specified flash rate and the arc struck as to commence an output within 1 minute after being energized and achieves specified intensity within 5 minutes of being turned on. During the one hour of operation, the manufacturer demonstrates that the equipment maintains the specified flash rate and, for capacitor discharge type flashing lights (strobe lighting), the proper amount of energy is being delivered to the flashtube as the input voltage is varied by ± 10 percent from nominal.

At the conclusion of the test, a visual inspection is conducted. Failure of the equipment to operate as specified is cause for rejection.

4.5 Rain Test

The wind-blown rain test is conducted per MIL-STD-810F, Method 506.4, Procedure I, paragraph 4.4.2. The rain is at a rate of 132mm/hour with an exposure time of 30 minutes per side. The equipment is operated throughout the test. Failure of the equipment to operate as specified is cause for rejection.

4.6 Wind Test

Evidence is provided, either by testing or by calculation of mechanical force, to demonstrate that installed light units meet the wind requirement in paragraph 3.2(c).

4.7 Humidity Test

The test is per MIL-STD-810F, Method 507.4, paragraph 4.5.2. The equipment is subjected to two complete cycles per Table 507.4-1, except the maximum chamber temperature is +55 degrees Celsius. Failure of the equipment to operate as specified is cause for rejection.

4.8 Salt Fog Test

The salt fog test is conducted per MIL-STD-810F, Method 509.4, paragraph 4.5.2. Failure of the equipment to operate as specified is cause for rejection. If corrosion is present, the third party certification body determines if it has impacted equipment structural integrity or functionality.

4.9 Sunshine Test

NOTE: The manufacturer may submit a certificate of compliance (for consideration by the third party certification body) from the manufacturer attesting to UV resistance (per MIL-STD-810F) in lieu of the testing requirements below.

The equipment is in its normal operational configuration for this test.

A sunshine test is conducted per MIL-STD-810F, Method 505.4, paragraph 4.4.3, Procedure II for all obstruction lighting equipment with nonmetallic exterior parts or plastic/thermoplastic light covers.

The equipment is subjected to a minimum of 56 cycles.

An operational test of the equipment is performed after 56 cycles.

Any evidence of deterioration of plastic parts: chalking, bleaching, cracking, hazing, or colour changes (yellowing) to the thermoplastic lenses of the test unit is cause for rejection.

For plastic/thermoplastic optical lenses or covers, the photometric performance is measured after this test.

4.10 System Operational Test

A system operational test is performed after the unit has been operated continuously without failure for 1000 hours with normal (12 hour) day/night cycling.

System components are connected with the necessary wiring to electrically simulate an actual installation in which the top and bottom light units on a structure are separated by 600 m for a system composed of CL-856 and/or CL-865 and 150 m for a system composed of CL-857 or CL-866, and the controller separated an additional 760 m. Simulated interconnecting cables with equivalent impedance may be used in lieu of full cable lengths.

The system is energized and operated to demonstrate compliance with all specification operating requirements such as flash rate, flash sequence, photoelectric switching of intensity steps, operation of interlocked devices, and satisfactory operation under input voltage variations.

If the power supply and optical head are separate components, it is demonstrated that with the maximum and minimum nameplate rated separation between components, proper energy is delivered to the light unit to produce the specified photometrics.

It is demonstrated that CL-810 and CL-864 lights produce the specified photometric requirement when energized over conductors (actual or simulated) representing the maximum and minimum nameplate rated cable length at the minimum input voltage.

APPENDIX C



Transport Canada **Transports Canada**

Aeronautical assessment form for
obstruction marking and lighting

TC File No./Ref No. – n° du dossier/N° de réf.

Applicant File No./Ref No. – n° du dossier/N° de réf.

1	Owner's name:		
	Address:		
	Telephone:	FAX:	
	Email address:		
2	Applicant's name:		
	Address:		
	Telephone:	FAX:	
	Email address:		
3	Description of Proposal (or as attached)		
4	Geographic coordinates: - <input type="checkbox"/> NAD83 <input type="checkbox"/> NAD27 <input type="checkbox"/> WGS84 N latitude:- deg (), min (), sec () W longitude: deg (), min (), sec ()		
5	Nearest: Community _____ Province _____		
6	Nearest aerodrome: _____		
7	Have you contacted the aerodrome? <input type="checkbox"/> Yes <input type="checkbox"/> No		
8	Notice of: <input type="checkbox"/> new construction <input type="checkbox"/> change to existing structure		
9	Duration: <input type="checkbox"/> permanent <input type="checkbox"/> temporary		
10	Proposed Construction Date: Beginning _____		
11	Temporary Structure From: _____ to: _____		
12	Marking and lighting Proposed: (Refer to Standard 621) <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Red lights and paint <input type="checkbox"/> Red and H.I. white lights <input type="checkbox"/> No lighting </div> <div> <input type="checkbox"/> Red and M.I white lights <input type="checkbox"/> White H.I. lights <input type="checkbox"/> Paint marking only </div> <div> <input type="checkbox"/> White M.I. lights <input type="checkbox"/> No painting <input type="checkbox"/> Other (provide description) </div> </div>		
13	Catenary/Cable Crossing <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Paint supporting structures <input type="checkbox"/> Support structure lighting </div> <div> <input type="checkbox"/> Cable marker spheres <input type="checkbox"/> Cable marker lights </div> <div> <input type="checkbox"/> Shore markers </div> </div>		
14	A Ground Elevation (AMSL):		
15	B Height of an addition to an existing structure:		
16	C Total structure height including #15 (AGL):		
17	Overall height (#14 plus #16) (AMSL):		
18	Does the proposal comply with Airport Zoning Regulations? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
I hereby certify that all the above statements made by me are true, complete and correct to the best of my knowledge. Also, I agree to mark and/or light and maintain the structure with established marking and lighting standards as necessary.			
Date	Name of the person filing notice		Signature

TRANSPORT CANADA ASSESSMENT

Marking and lighting required: (as per Standard 621)

☐ Lighting Required☐ Paint Required☐ Temporary Lighting Required

Comments (Transport Canada use only)

Civil Aviation Inspector -

Signature:

Date: (d - m - y)

Note 1: This assessment is only valid for one year from the date of assessment and applicable to the proposal as submitted.

Note 2: If there is a change to the intended installation, a new submittal is required.

USE AND INSTRUCTIONS FOR COMPLETING FORM (page 1)

A. **Purpose of Form:** The purpose of this form is to specify the location of new or altered structures that may pose a hazard to aviation. It also allows Transport Canada (TC) to identify proposals that conflict with Air Regulations or, as necessary, to advise the applicant of marking and lighting requirements. This form does not constitute authority for construction.

B. **When to Complete the Form:** Completed forms, electronic or paper, are submitted at least 90 days prior to all alterations which increase the structure's height; or for proposed new structures if:

- (i) of such a height as to penetrate an airport obstacle limitation surface specified in the *Aerodrome Standards and Recommended Practices Manual* - TP312;
- (ii) within 6 km of the centre of an aerodrome;
- (iii) higher than 90 m AGL within 3.7 km of the centreline of a recognized VFR route such as, but not limited to, a valley, a railroad, a transmission line, a pipeline, a river or a highway;
- (iv) higher than 150 m AGL at any other location; or
- (v) a component of a catenary wire crossing where any portion of the wires or supporting structures exceed 90 m AGL;

C. **Supporting Data and Documents**

- (i) a 1:50,000 scale map, or the most detailed map available showing ground contour elevations to allow determination of the structure's latitude and longitude.
- (ii) sketches, plans or blueprints for structures other than radio or TV antennae.

D. Please note that this assessment process applies to Transport Canada's requirements only, and assesses the proposed marking and lighting of objects in accordance with standards contained in Standard 621.

E. This form does not constitute authority for construction.

F. This form neither constitutes nor replaces any approvals, permits or assessments required by Nav Canada, Industry Canada, other Federal Government departments, Provincial or Municipal land use authorities or any other agency from which approval/assessment is required.

G. Completed applications are to be forwarded to the applicable Transport Regional office listed in Appendix A.

H. A separate application is to be submitted to Nav Canada. For a detailed description on Nav Canada's requirements and additional information, refer to the Nav Canada Land Use Proposal website at www.navcanada.ca

I. If the proposed construction does not take place, notification is sent to Transport Canada.

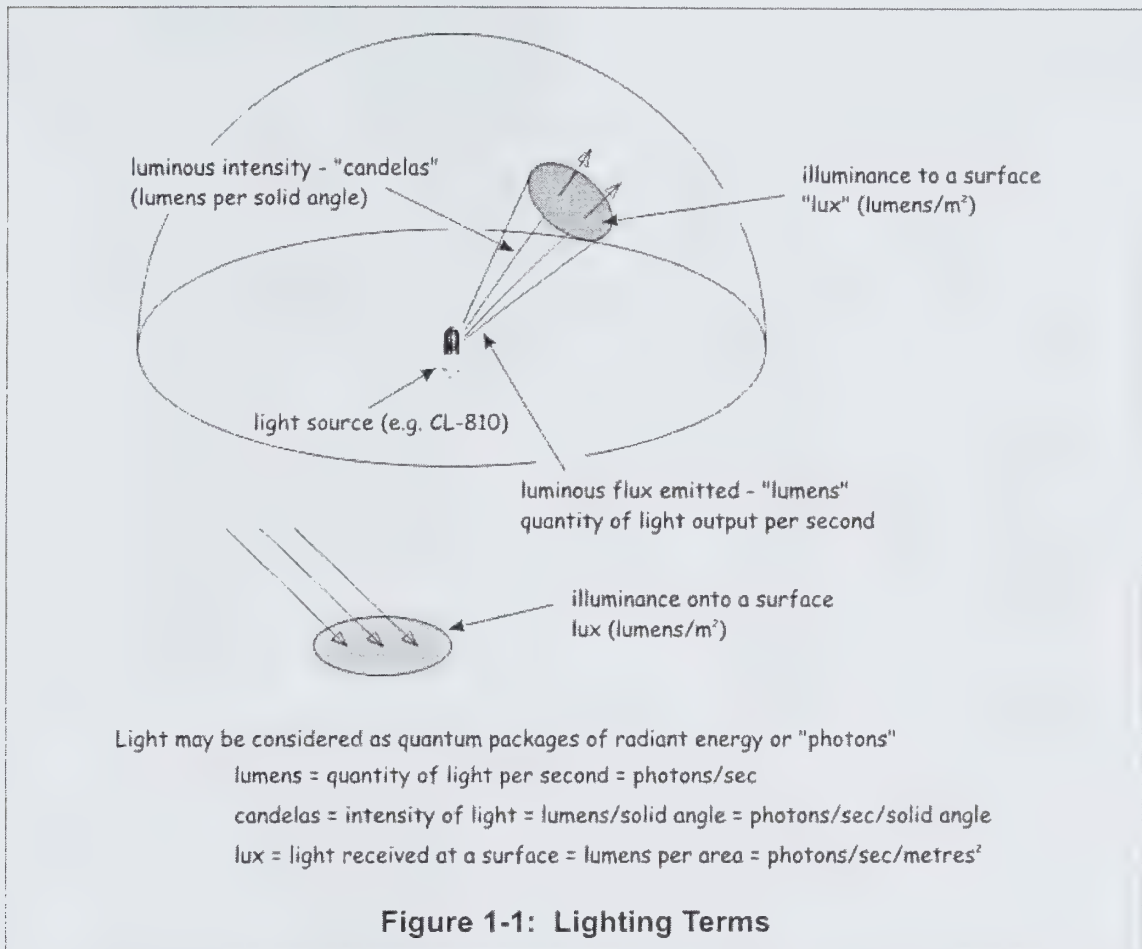
Abbreviations

AMSL	Above Mean Sea Level
AGL	Above Ground Level
M.I.	Medium Intensity
H.I.	High Intensity
VFR	Visual Flight Rule
ICAO	International Civil Aviation Organization

USE AND INSTRUCTIONS FOR COMPLETING FORM (page 2)

item	
1	The Owner of the structure who is responsible for installation of marking and lighting. Include name, address and phone number of a personal contact point as well as the company name.
2	The Owner's representative who is making application, if other than ITEM #1 Include name, address and phone number of a personal contact point as well as the company name.
3	Provide a narrative description of the proposal (a) - MANDATORY - Indicate the type of structure. (e.g. antenna, crane, building, power line, landfill, water tank, wind farm, moored balloon, kite, catenary/cable crossing, etc.) (b) - For overhead wires or transmission lines, include size and configuration of wires and their supporting structures (Attach depiction). (c) - For each pole/support, include coordinates, site elevation, and structure height above ground level or water. For buildings, include site orientation, coordinates of each corner, dimensions, and construction materials. For alterations, explain the alteration thoroughly. (d) - For a proposed wind farm, include a spreadsheet with Turbine ID, geographic coordinates (in minutes, degrees and seconds), height above ground, and ground elevation. (e) - For existing structures, thoroughly explain the reason for notifying Transport Canada (e.g. corrections, no record on file with Transport Canada or previous study, etc.). (f) - For Catenary crossings, the geographic coordinates for all pertinent support structures are provided along with heights AMSL and AGL including the height of wires above ground or water level. (g) - If available, attach a copy of a documented site survey with the surveyor's certification stating the amount of vertical and horizontal accuracy in feet. (h) - Description of surrounding environment and structures. Provide photographs of the area of intended installation.
4	Latitude and longitude must be geographic coordinates, to within the nearest second or to the nearest hundredth of a second if known. For accuracy of the measurement refer to ICAO Annex 15 <i>Aeronautical Information Services</i> .
5	Enter the name of the nearest community, city or town to the site. If the structure is or will be in a community, enter the name of that community.
6	Enter the name of the nearest aerodrome.
7	It is recommended that the nearest aerodrome be contacted to resolve any difficulties that the installation may pose to aerodrome operations.
8	(a) - New Construction would be a structure that has not yet been built. (b) - Alteration is a change to an existing structure such as the addition of a top mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alteration is included in ITEM #3 "Description of Proposal". (c) - Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has not been assessed. The reason for the notice is included in ITEM #3 "Description of Proposal".
9	A temporary structure would be such as a crane or drilling derrick.
10	Enter the date for the start of construction.
11	Enter the time period during which the temporary structure will be in place.
12	Refer to Standard 621 for requirements of marking and various lighting systems.
13	Indicate the form of marking and lighting that is proposed for the catenary crossing. Enter the total structure height AGL in metres. The total structure height includes anything mounted on top of the structure, such as antennae, obstruction lights, lightning rods, etc., in addition to the structure itself.
14	Enter the ground elevation AMSL expressed in metres or feet. This data should match the ground contour elevations for site depiction submitted under ITEM #3.
15	Enter the height of the object if it is an addition to an existing structure. The height will determine the need for lighting of this object and may affect the heights of intermediate levels of lighting on the structure.
16	Enter the total structure height AGL in metres or feet. The total structure height includes anything mounted on top of the structure, such as antennae, obstruction lights, lightning rods, etc.
17	Enter the overall height AMSL. This will be the total of ITEM #14 plus ITEM #16.
18	Assistance in regard to zoning regulations can be obtained from Transport Canada.

Figures



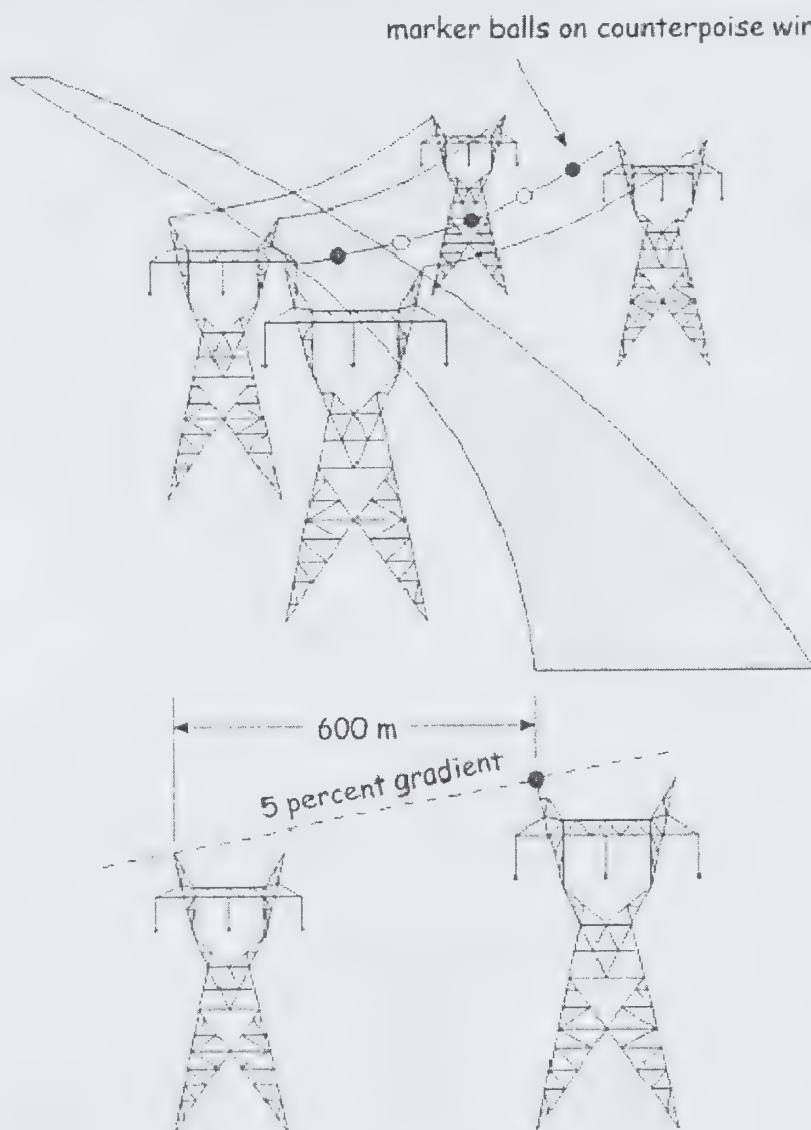
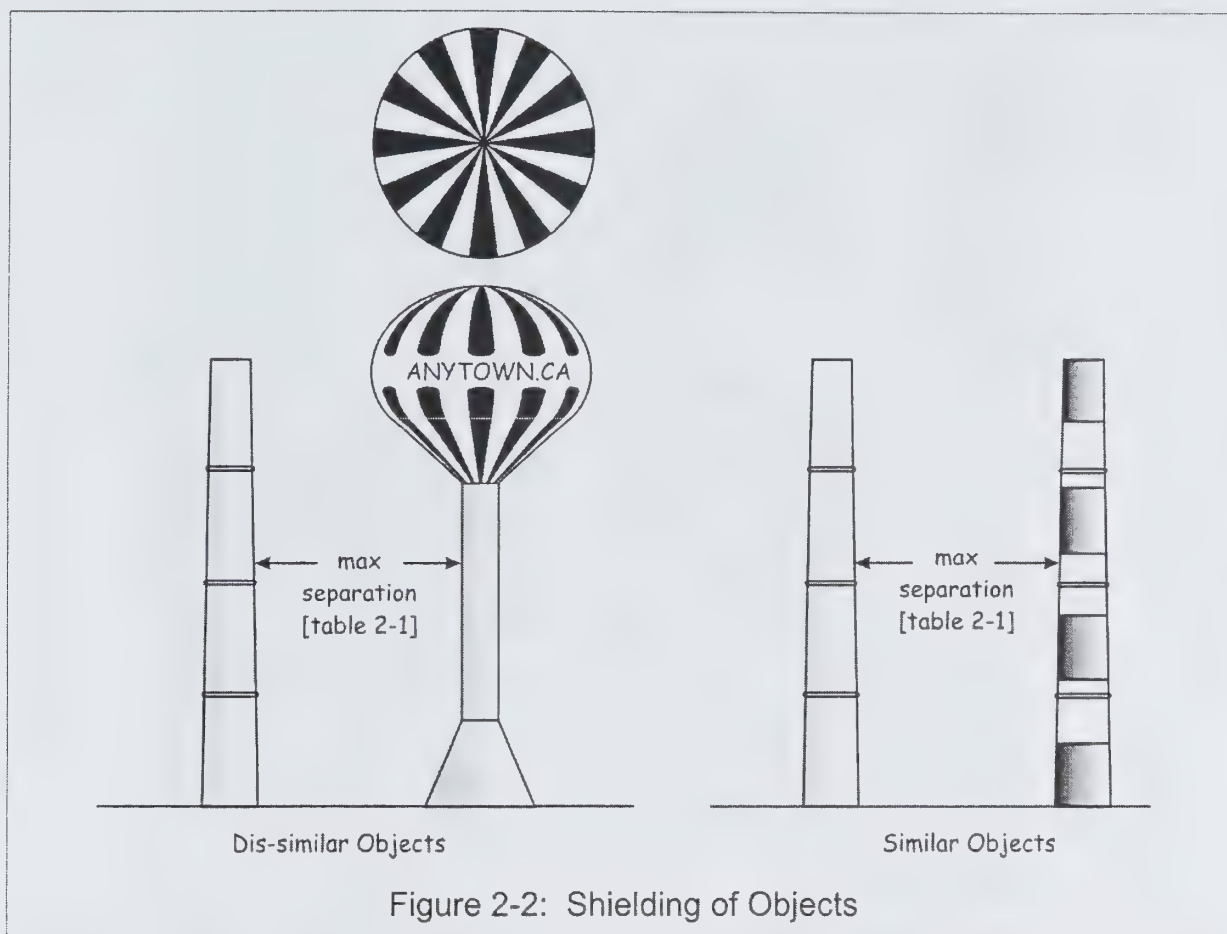
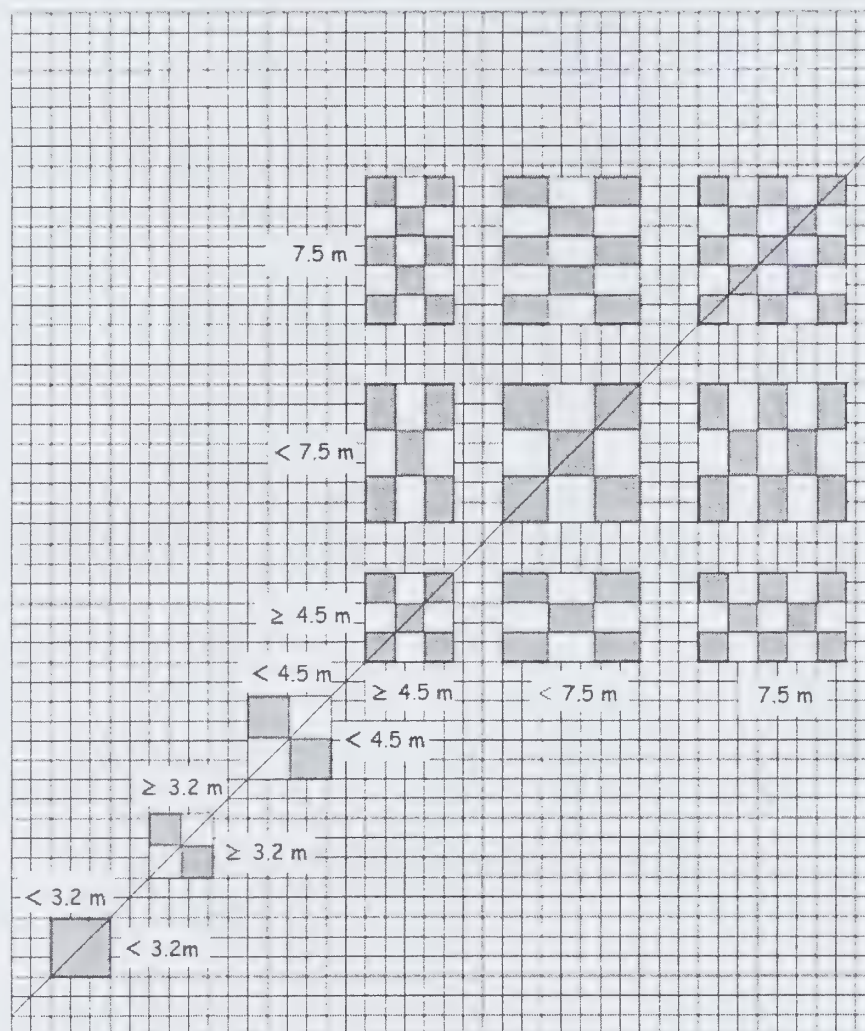


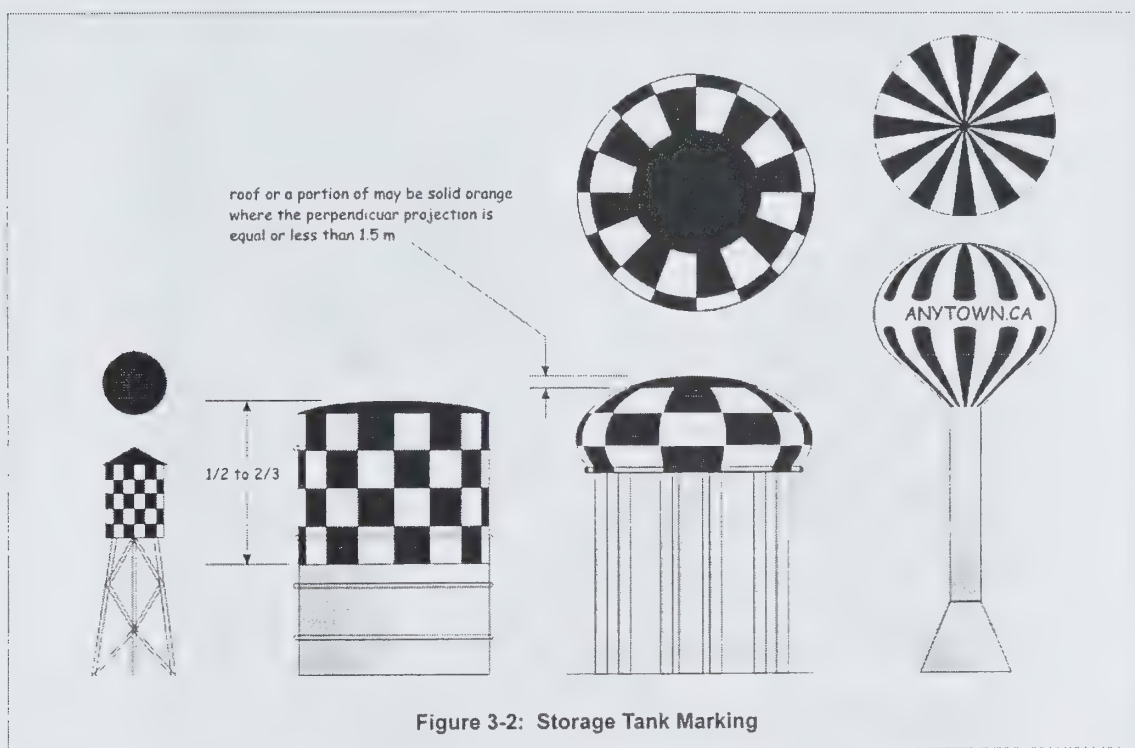
Figure 2-1: Shielding of Catenaries

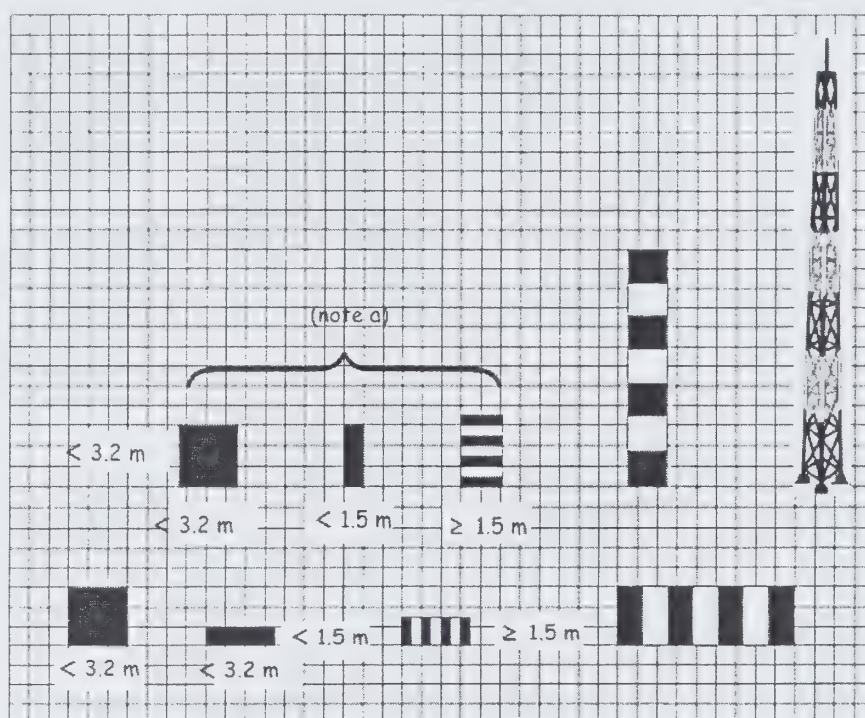




- (a) In order to maintain a minimum size of rectangles of 1.5 m, objects having sides 3.2 m to less than 4.5 m would have a pattern of four rectangles.
- (b) Objects, with sides of 4.5 m and above, have an odd number of rectangles, so that the corners may be orange in colour.
- (c) This figure provides a criteria for checkerboard patterns. This may need to be modified somewhat to allow for objects of different shape.

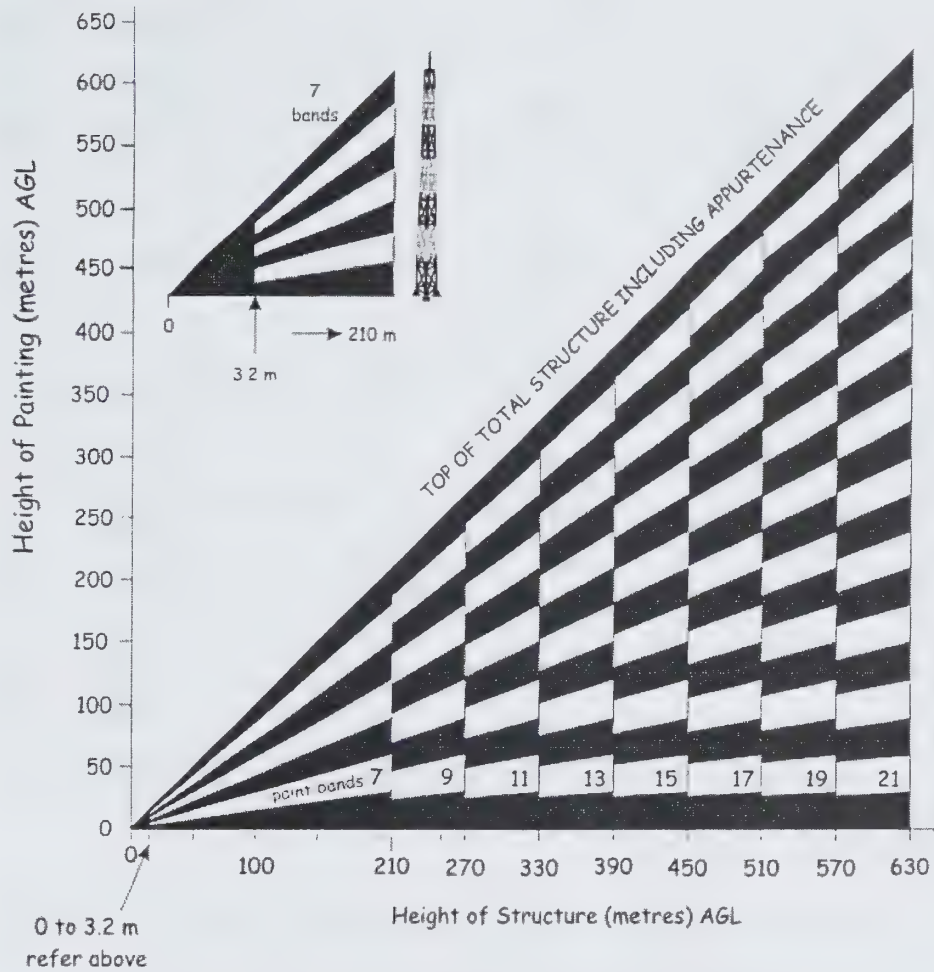
Figure 3-1: Day Marking - Checkerboard Pattern





- (a) Applicable to building structures. Banded poles and towers may be less than 1.5 m.
(b) Bands are not less than 0.5 m in size.
(c) The banded pattern consists of 7 bands of which the top/bottom, left/right bands are the darker color.

Figure 3-3: Day Marking - Banded Pattern



**Figure 3-4: Day Marking - Skeletal Structures
(alternate bands)**

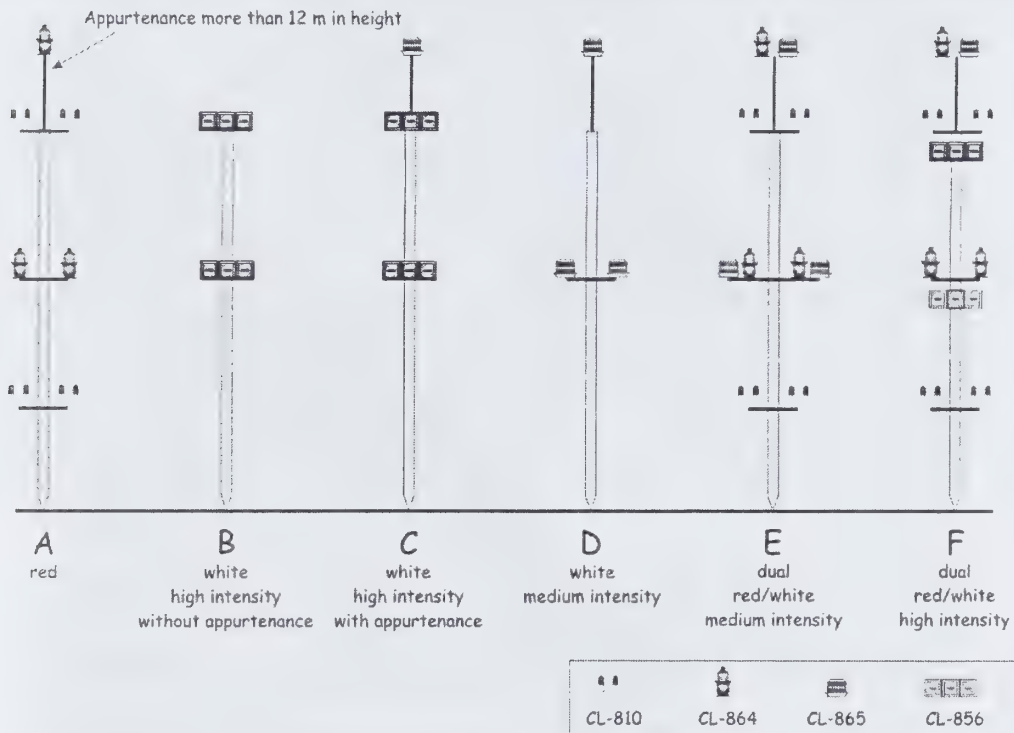


Figure 4-1: Configurations of Lighting on Skeletal Structures

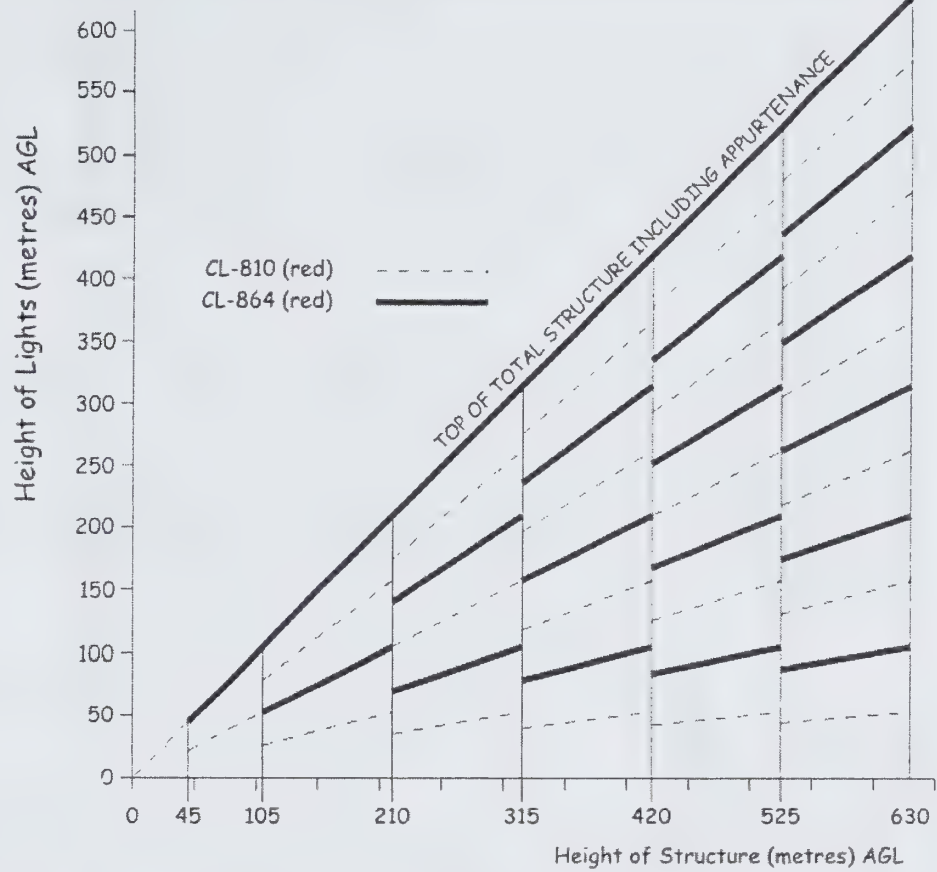
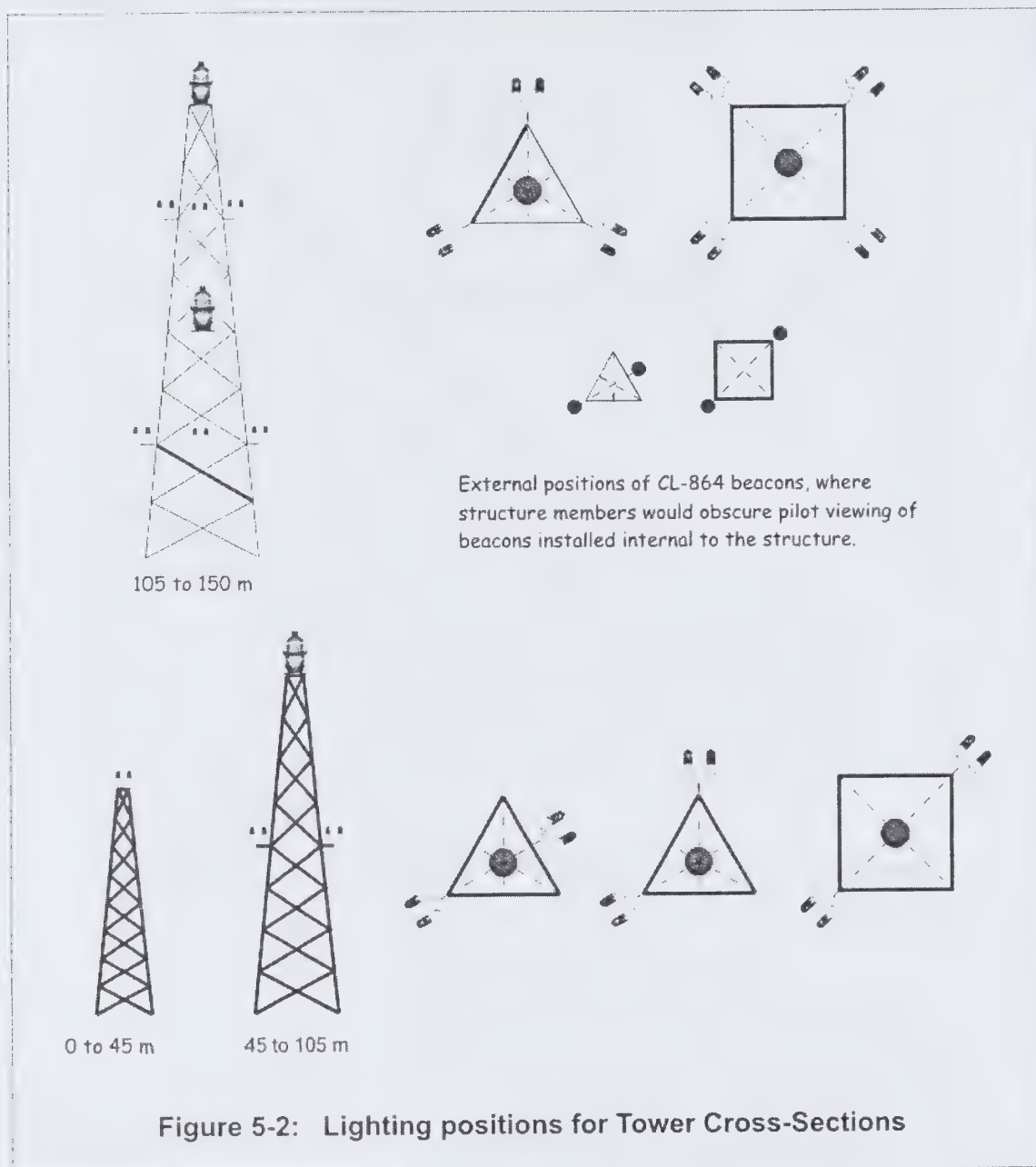


Figure 5-1: Red Lighting System, Light Levels Configuration "A"



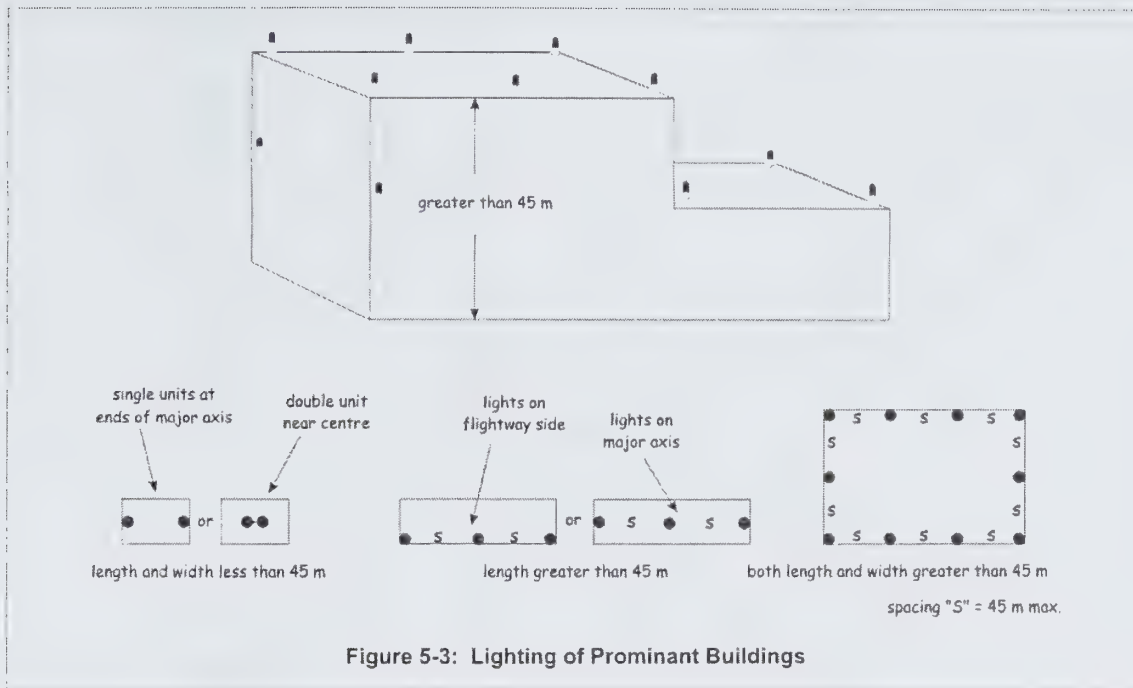


Figure 5-3: Lighting of Prominent Buildings

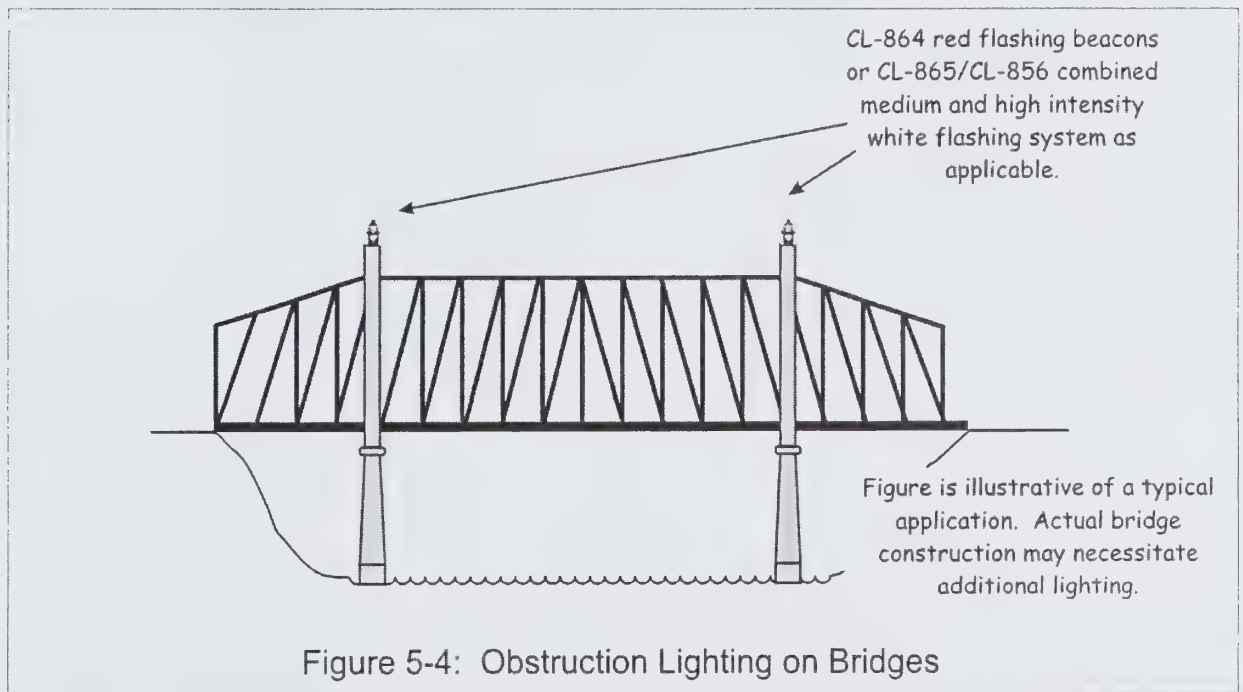


Figure 5-4: Obstruction Lighting on Bridges

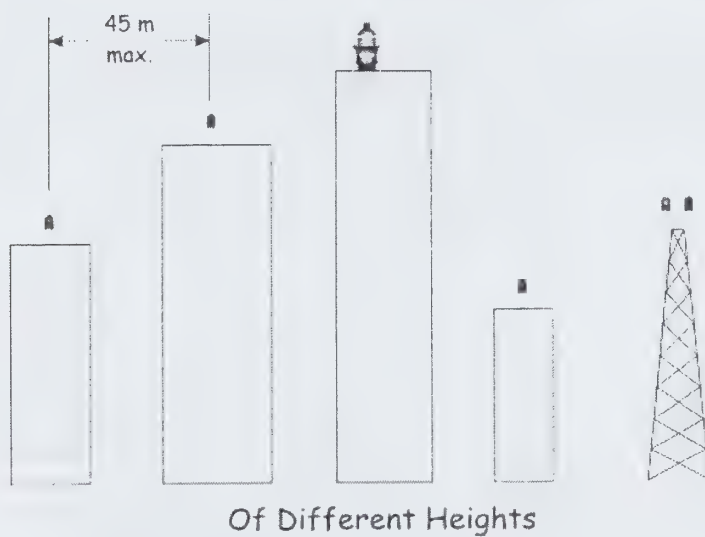
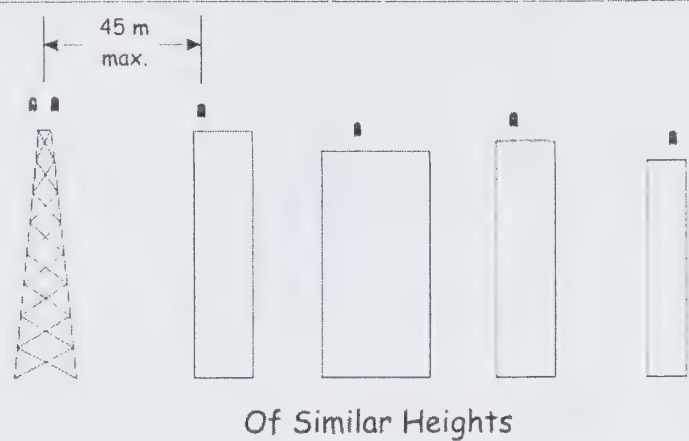


Figure 5-5: Groups of Obstructions

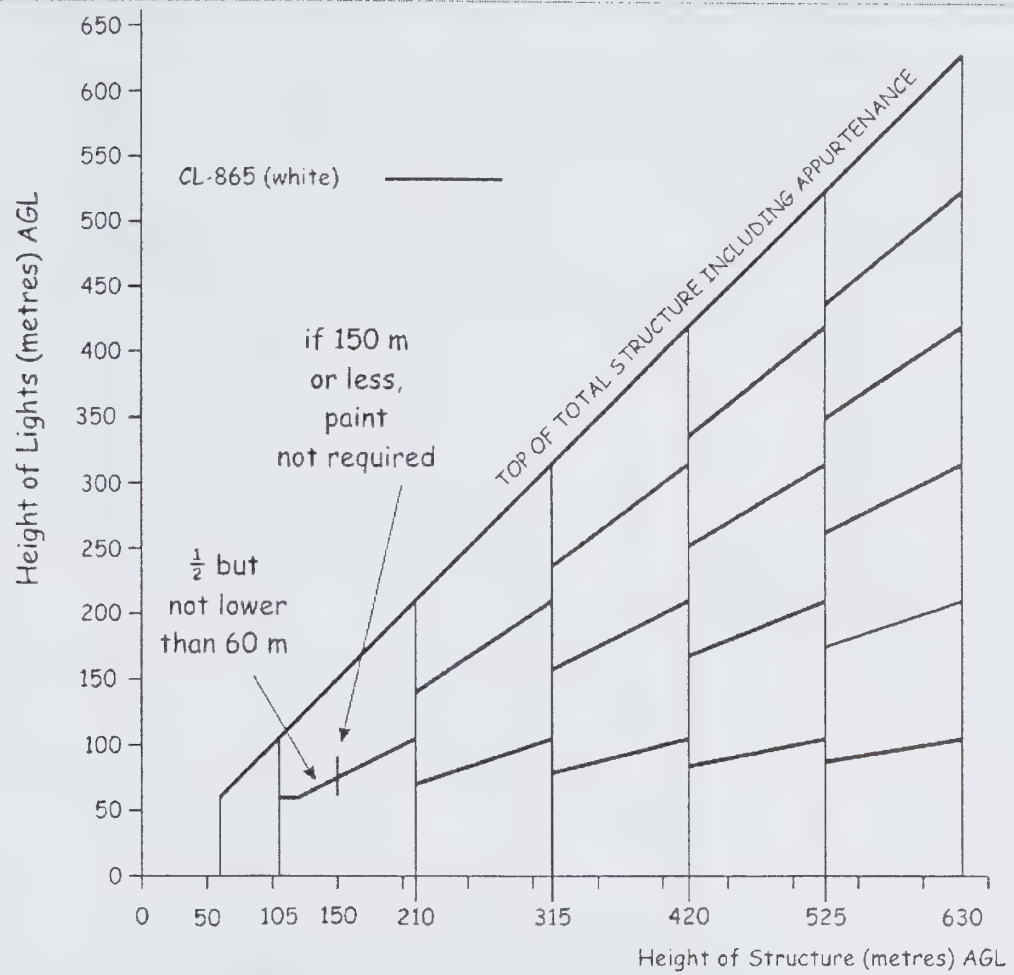


Figure 6-1: Medium Intensity White Lighting System Configuration "D"

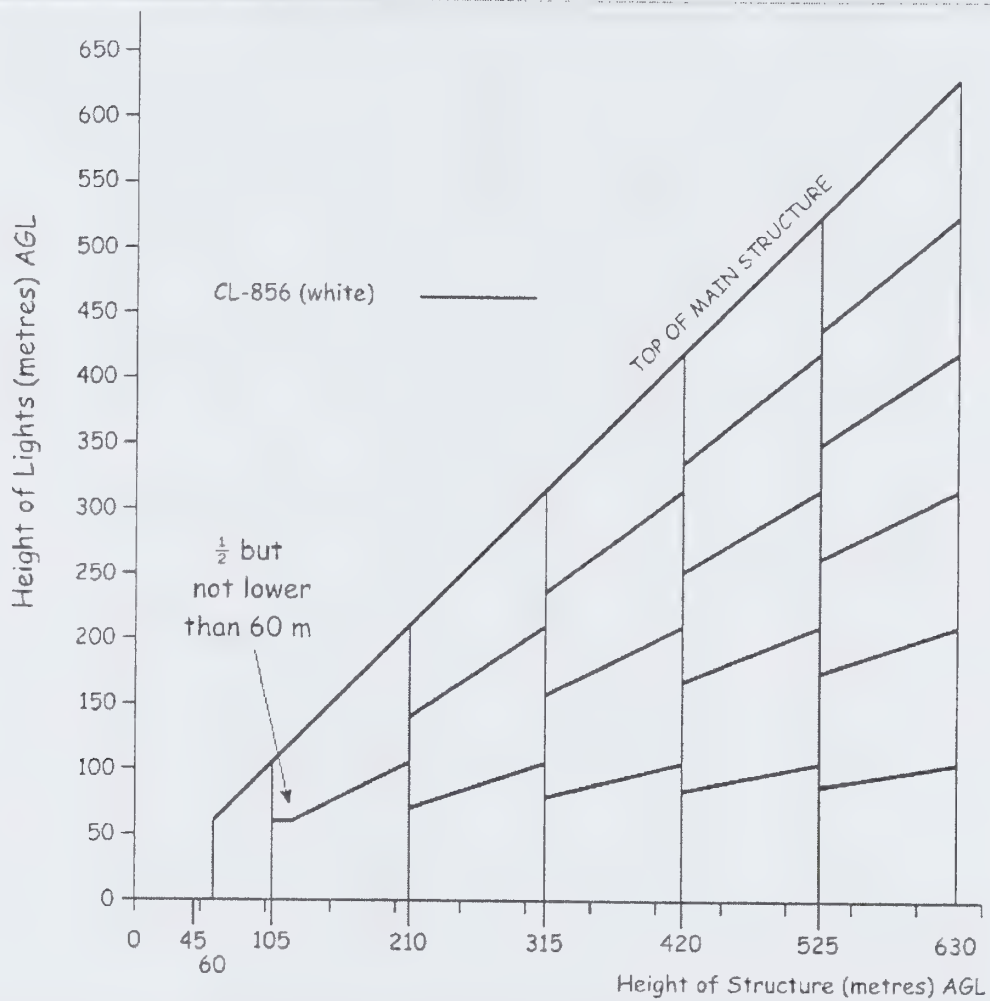


Figure 7-1: High Intensity White Flashing System - Configuration "B"

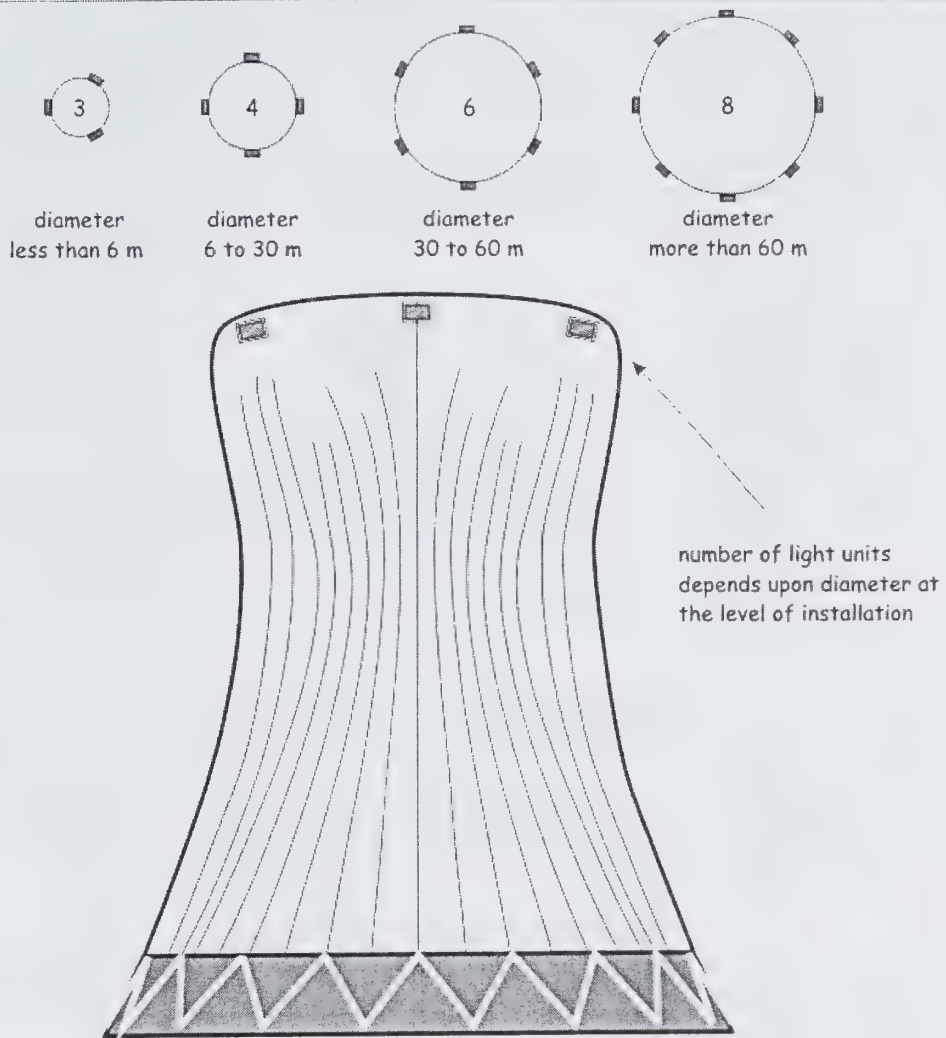
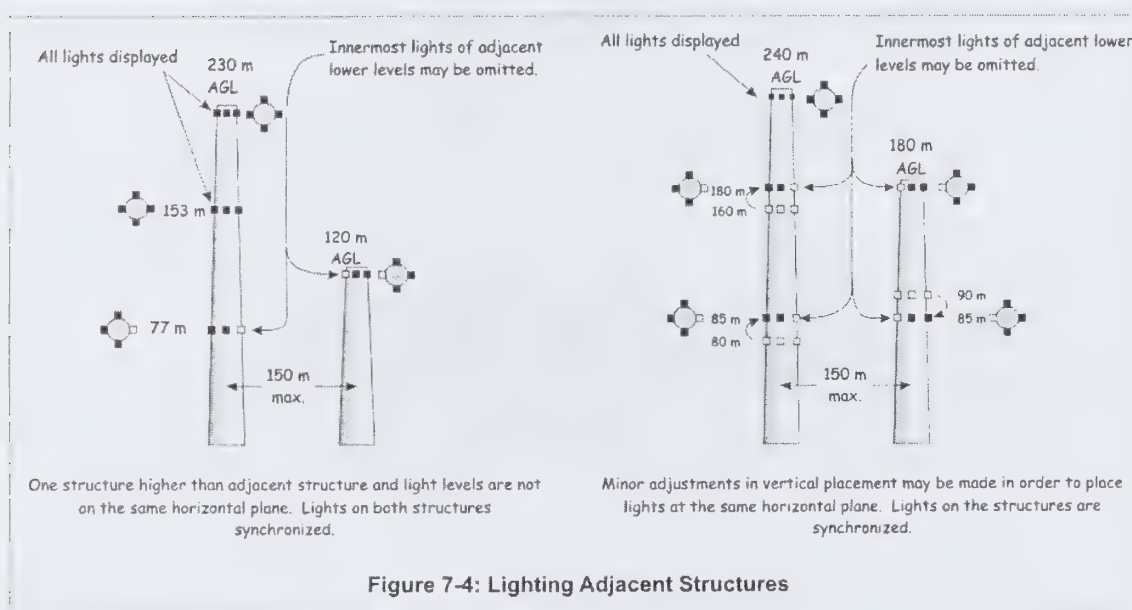
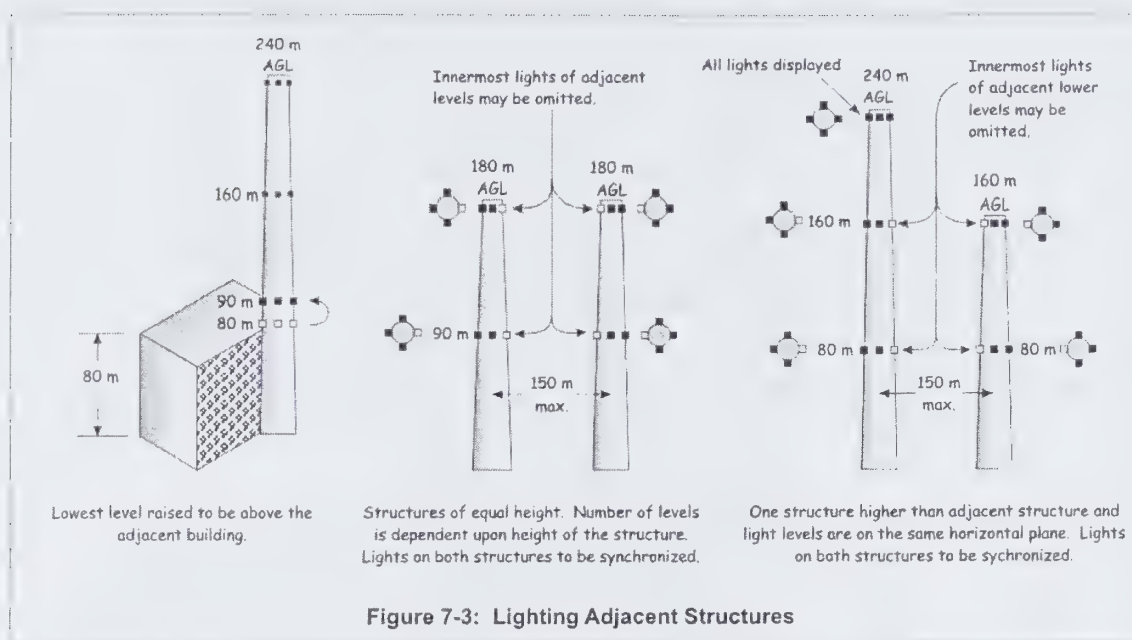
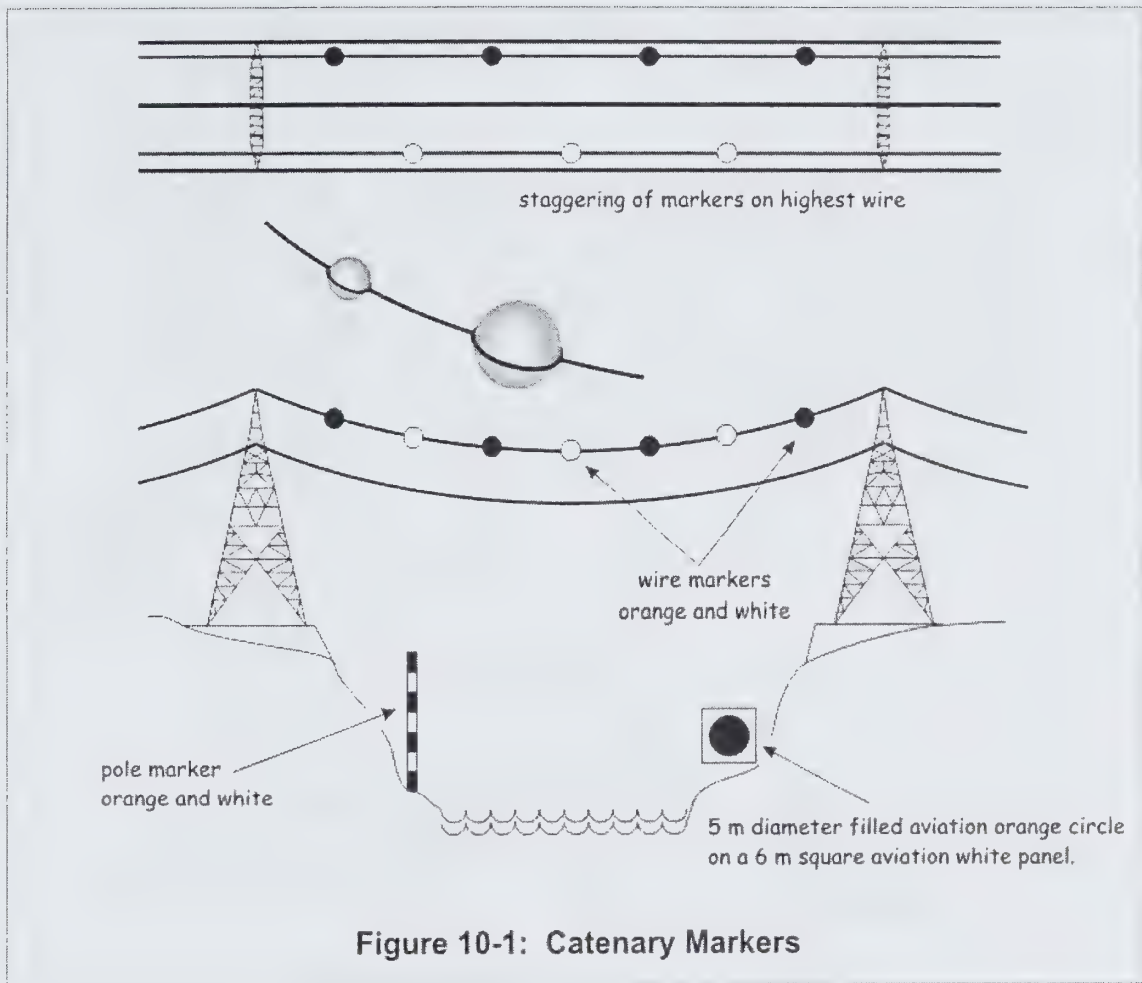
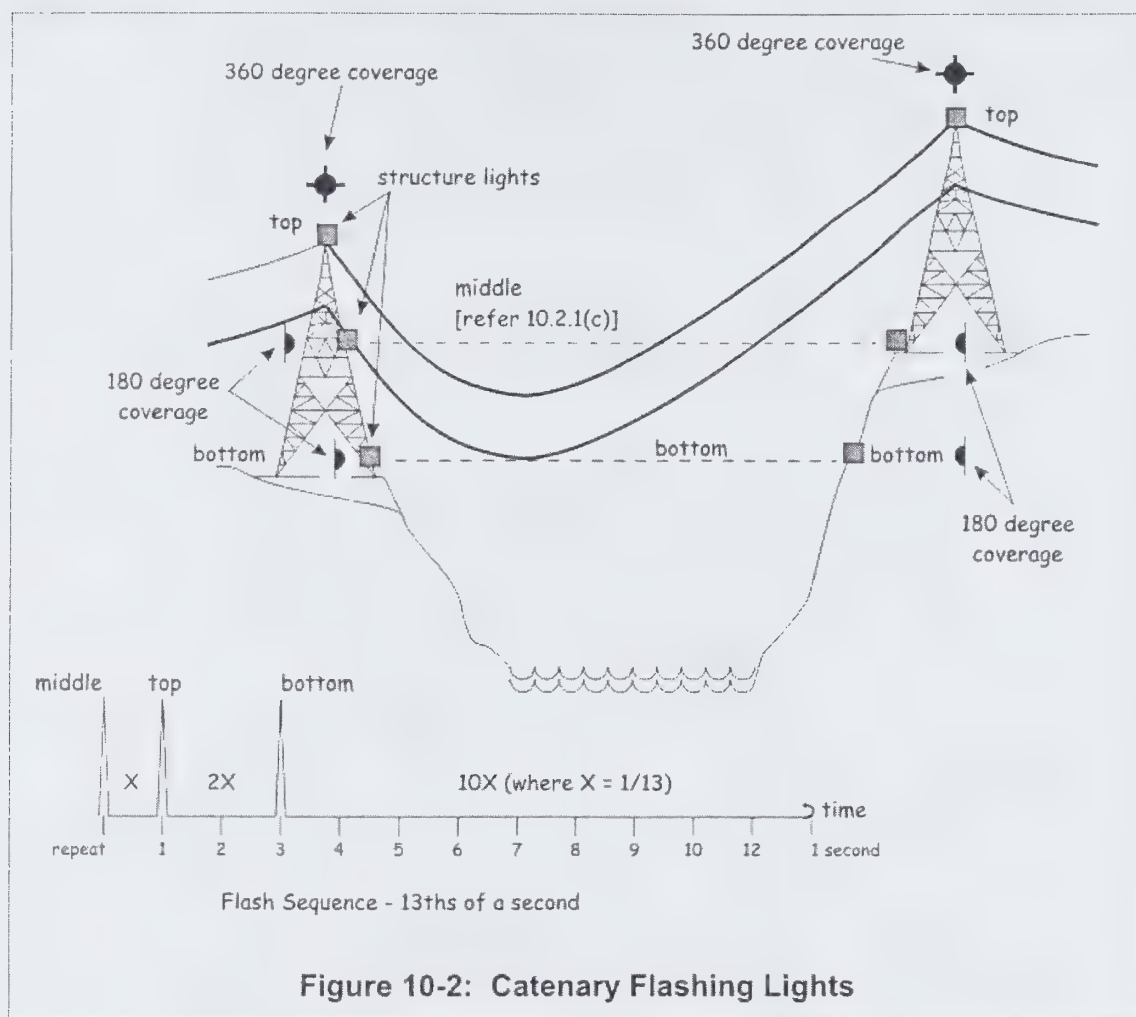
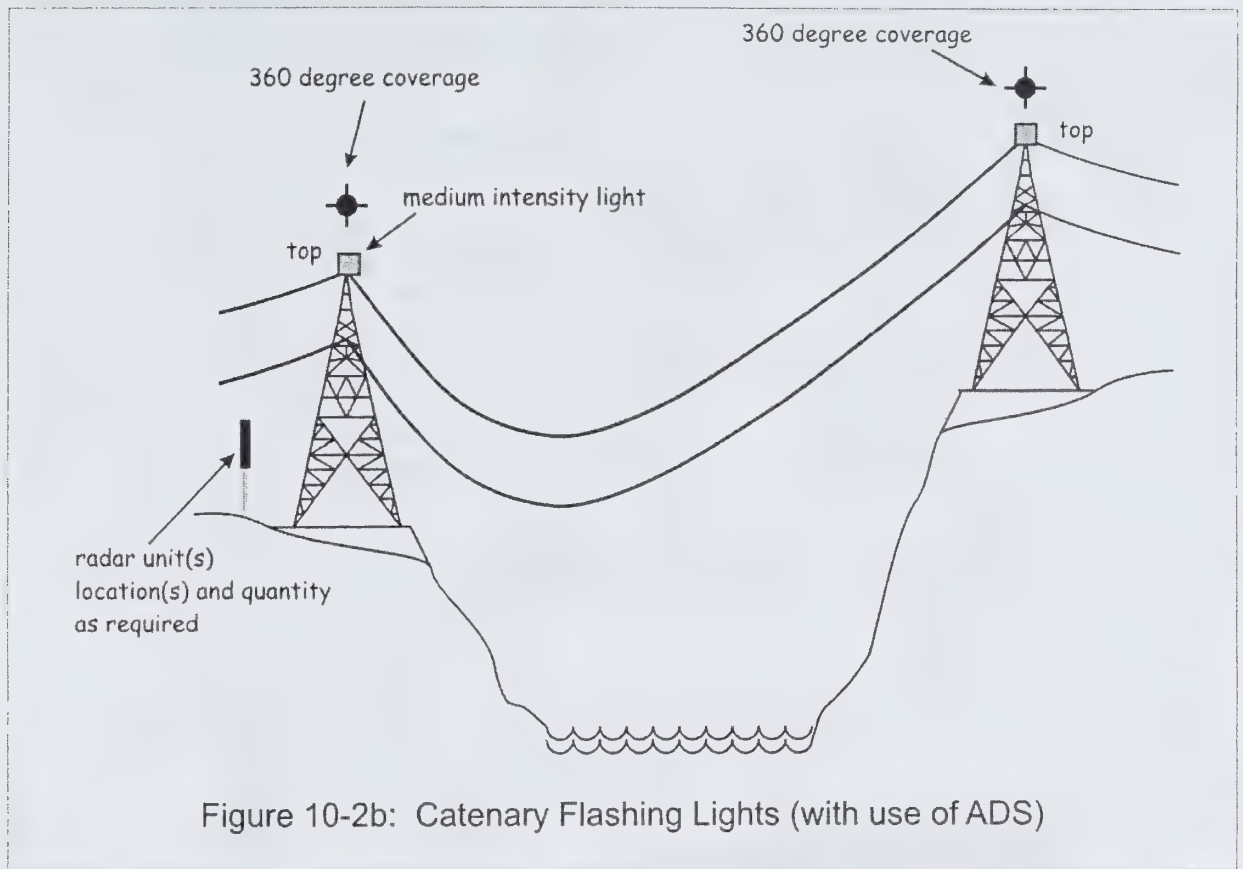


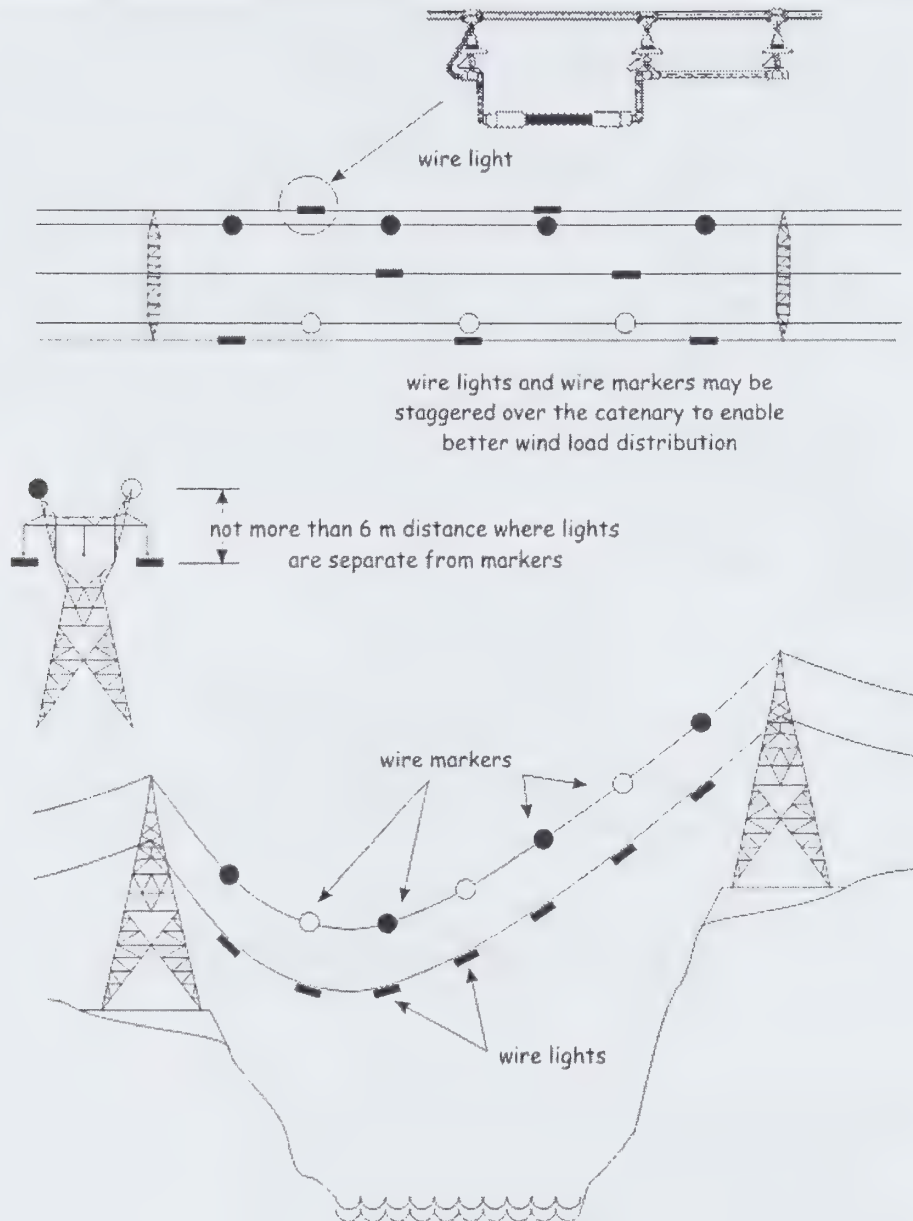
Figure 7-2: Hyperbolic Cooling Tower





**Figure 10-2: Catenary Flashing Lights**



**Figure 10-3: Catenary Wire Lights**

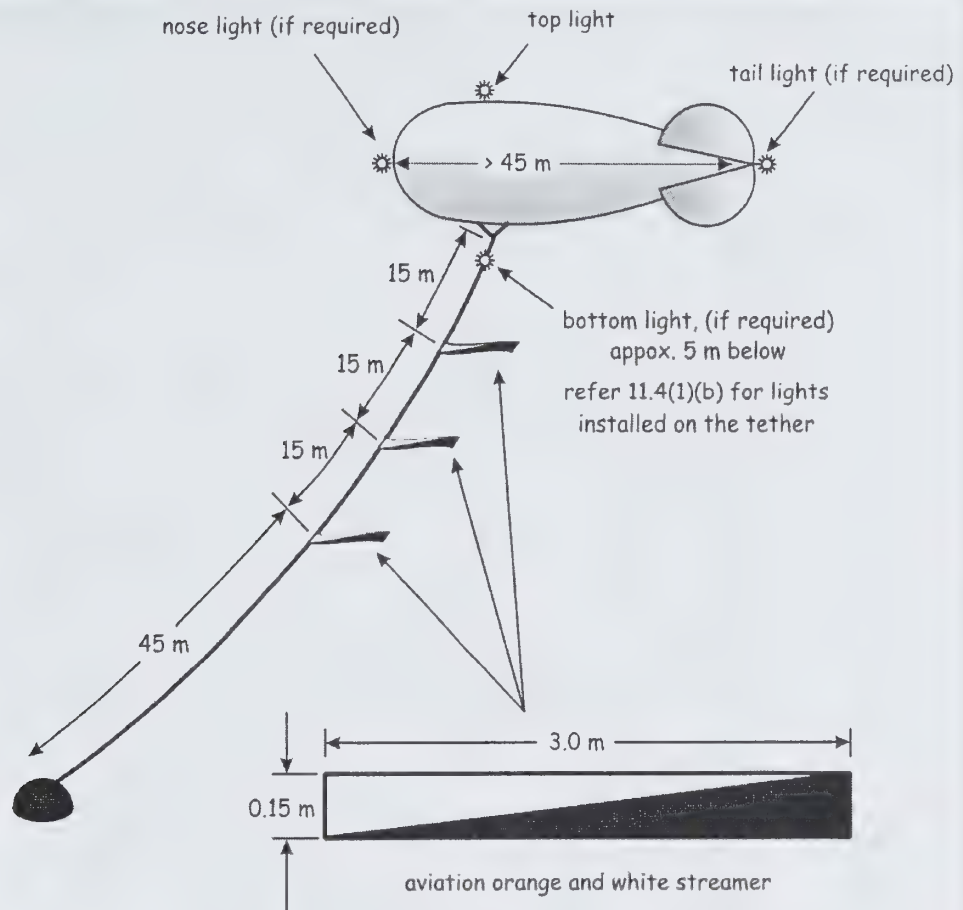
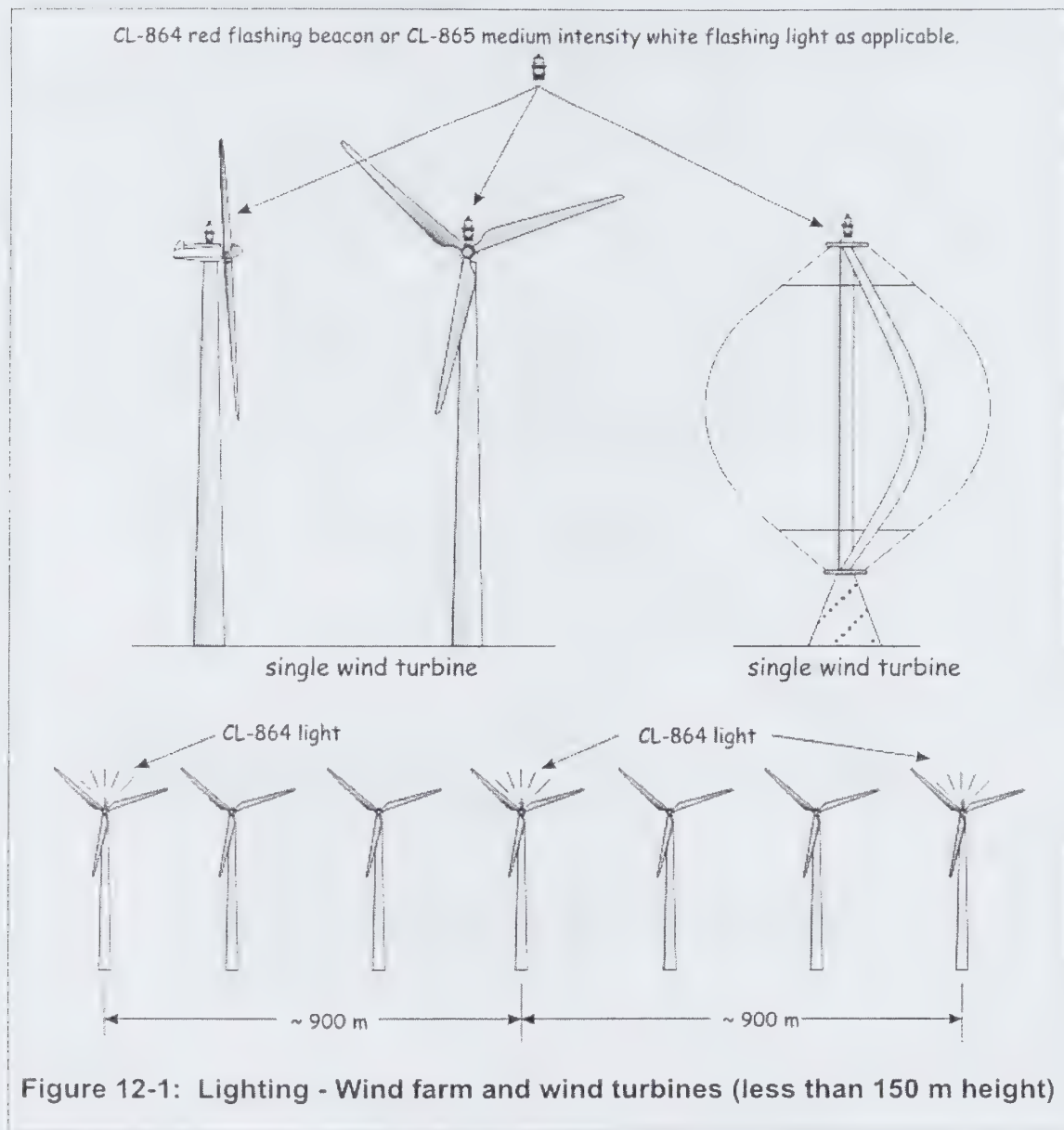
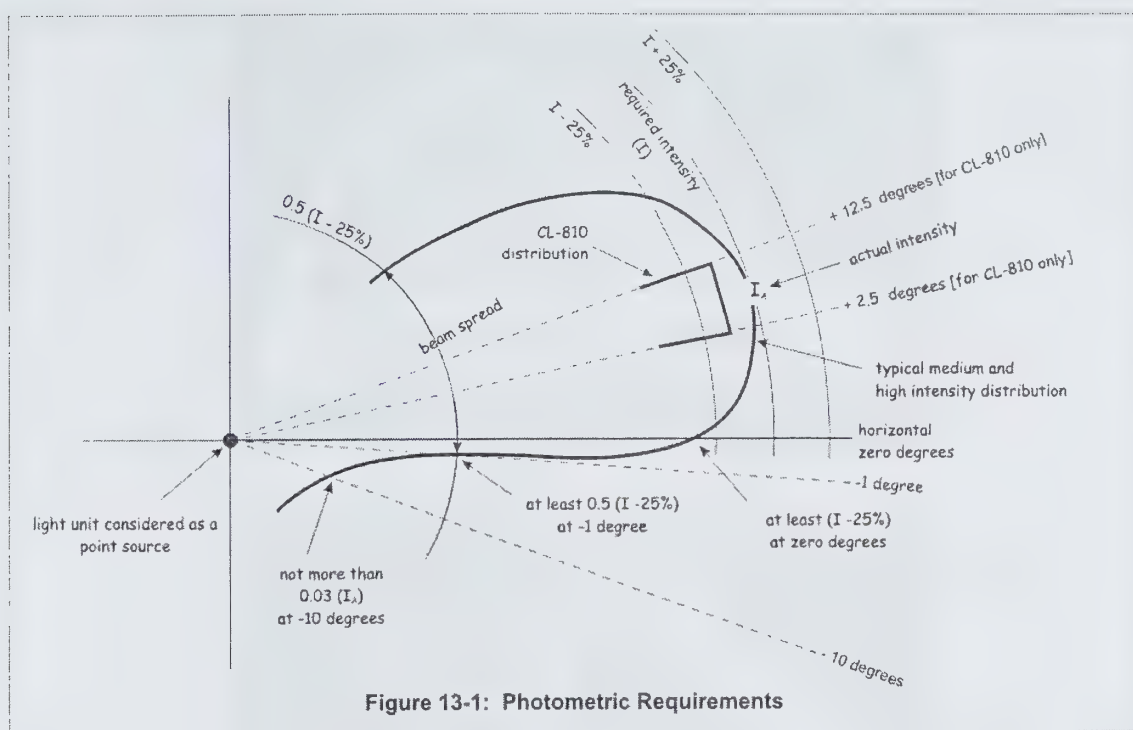


Figure 11-1: Marking and Lighting of Moored Balloons





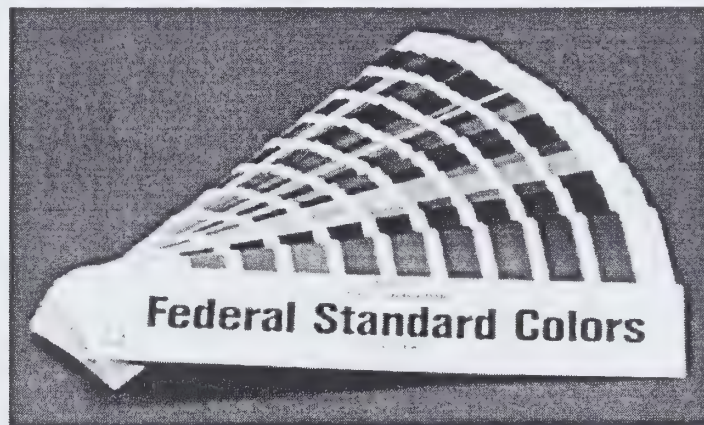


Figure 14-1: Colour Standard

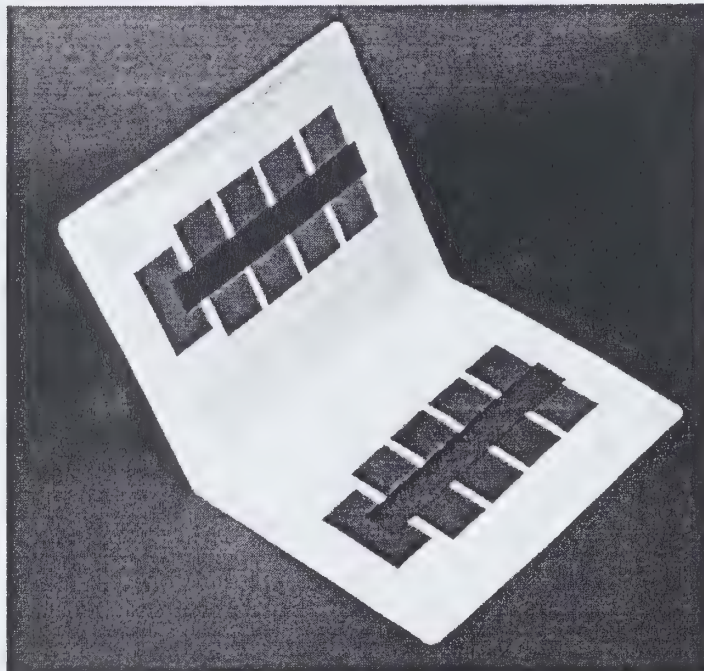
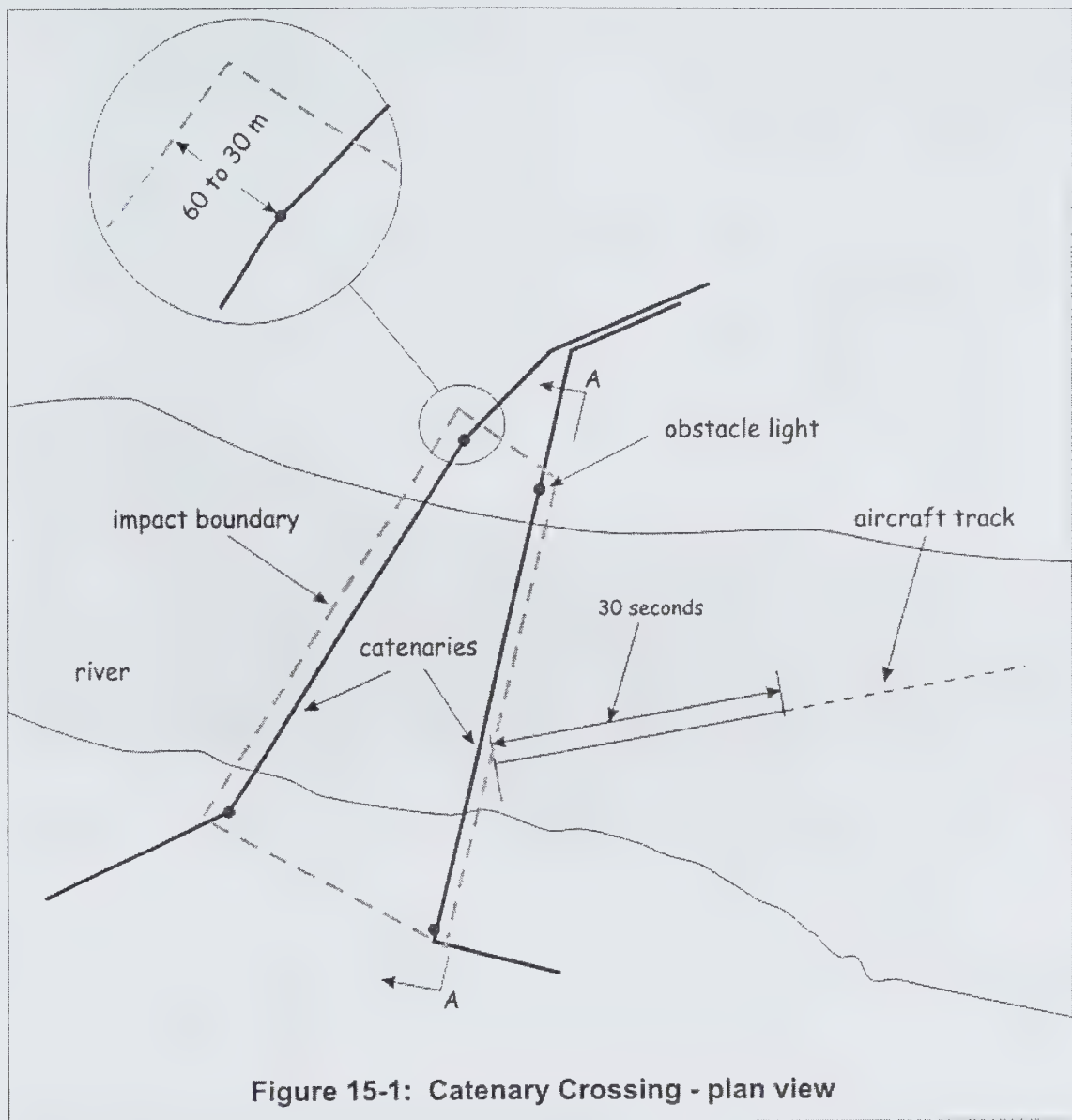
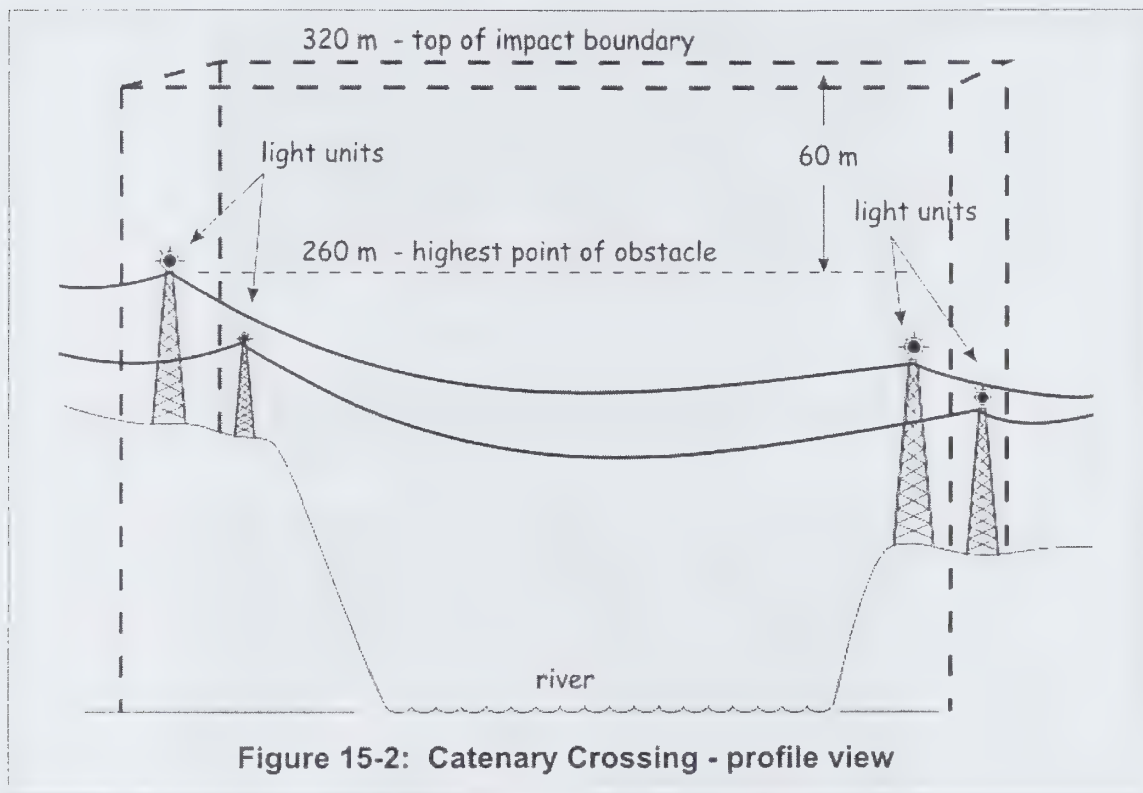
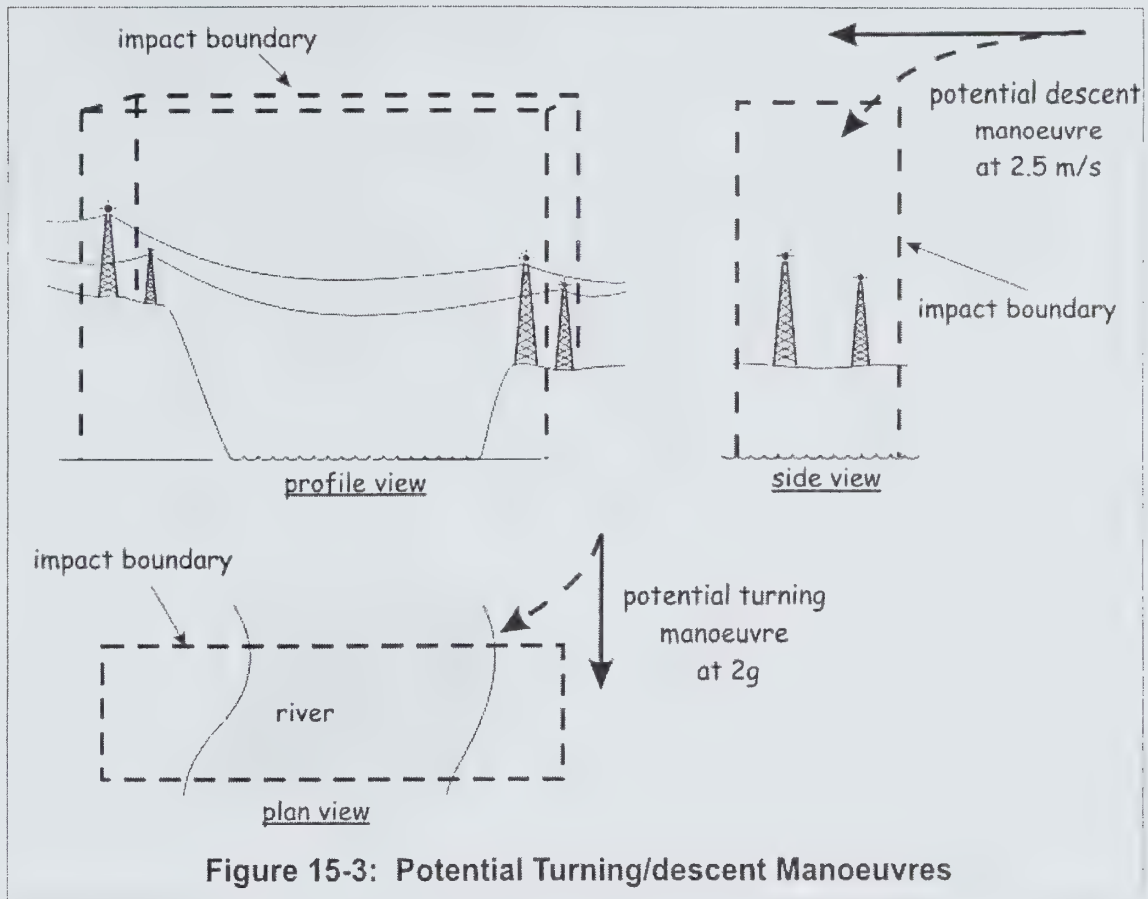


Figure 14-2: Aviation Orange Colour Tolerance Chart









Transport Canada
Safety and Security

Transports Canada
Sécurité et sûreté

CARs

CANADIAN AVIATION REGULATIONS

***GENERAL OPERATING AND FLIGHT
RULES STANDARDS
622.11 - GROUND ICING
OPERATIONS***



Canada

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NOTE

All amendments to the CARs will be indicated by the Coming into Force date, immediately following the amended text.

RECORD OF AMENDMENTS

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Operating and Flight Rules Standards
622.11 - Ground Icing Operations

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Operating and Flight Rules Standards 622.11 - Ground Icing Operations

Division I

General

1.0 Introduction

In order to operate an aircraft under icing conditions in accordance with the requirements of CAR Section 602.11, an operator must have a program as specified in these standards and the dispatch and take-off of the aircraft shall comply with that program. These *Ground Icing Operations Standards* specify the program elements, for both operations and training, that shall be addressed in an operator's Ground Icing Operations Program and described in the appropriate operator's manuals. As applied to Canadian operators, these Standards outline a Program's minimum requirements, which may be adapted according to the needs of the individual operator. Foreign operators should use this Standard as a guideline for the development of their Ground Icing Operations Program in Canada.

2.0 Definitions

The following are definitions of important terms used in these Standards.

Anti-icing: Anti-icing is a precautionary procedure that provides protection against the formation of frost or ice and the accumulation of snow on treated surfaces of an aircraft for a period of time.

Contamination: Contamination means any frost, ice or snow that adheres to the critical surfaces of an aircraft.

Critical Surfaces: Critical surfaces means the wings, control surfaces, rotors, propellers, upper surface of the fuselage on aircraft that have rear-mounted engines, horizontal stabilizers, vertical stabilizers or any other stabilizing surface of an aircraft.

Critical Surface Inspection: A critical surface inspection is a pre-flight external inspection of critical surfaces conducted by a qualified person as specified in Part VI, subsection 602.11(5), to determine if they are contaminated by frost, ice, or snow. Under ground icing conditions, this inspection is mandatory.

De-icing: De-icing is a procedure by which frost, ice, or snow is removed from the critical surfaces of an aircraft in order to render them free of contamination.

Ground Icing Conditions: With due regard to aircraft skin temperature and weather conditions, ground icing conditions exist when frost, ice, or snow is adhering or may adhere to the critical surfaces of an aircraft.

Ground Icing Operations Program: A Ground Icing Operations Program consists of a set of procedures, guidelines, and processes, documented in manuals, that ensure that an operator's aircraft does not depart with frost, ice, or snow adhering to critical surfaces.

Holdover Time: Holdover time is the estimated time that an application of de-icing/anti-icing fluid is effective in preventing frost, ice, or snow from adhering to treated surfaces. Holdover time is calculated as beginning at the start of the final application of de-icing/anti-icing fluid and as expiring when the fluid is no longer effective.

Pre-Take-off Contamination Inspection: A pre-take-off contamination inspection is an inspection conducted by a qualified person, immediately prior to take-off, to determine if an aircraft's critical surfaces are contaminated by frost, ice, or snow. This inspection is mandatory under some circumstances.

3.0 Program Elements

The following elements, which are described in the sections below, will be included in an operator's Ground Icing Operations Program and described in the appropriate manual(s):

- The Operator's Management Plan;
- Aircraft De-icing/Anti-icing Procedures;
- Holdover Timetables;
- Aircraft Inspection and Reporting Procedures; and
- Training and Testing.

4.0 The Operator's Management Plan

According to Canadian regulations, the aircraft operator is responsible for the operational control of an aircraft. In order to properly exercise operational control under ground icing conditions, a Management Plan to ensure proper execution of the operator's approved Ground Icing Operations Program must be developed and implemented.

The Management Plan will identify the management position responsible for the overall Program, identify each subordinate position, and describe those functions and

responsibilities needed to properly manage the Program. The Plan must also describe operational responsibilities and procedures, delineate the chain of command, define the relationship between its operations and maintenance groups, and ensure that all parties are informed of their responsibilities with regard to the Program. Although the Program is usually an operations responsibility, it may be shared between operations and maintenance. The Program may be the sole responsibility of operations, but never the sole responsibility of maintenance.

4.1 Operations

The Plan must identify the management position responsible for ensuring that:

- a) all the necessary elements of the Program have been developed, properly integrated, and coordinated;
- b) the Program has been disseminated to all personnel who have duties, responsibilities, and functions to perform within the Program;
- c) a detailed description of the Program is incorporated in the appropriate operator's manuals;
- d) sufficient competent personnel and adequate facilities and equipment are available at each airport where the Program may be applied; and
- e) adequate management supervision of the Program is maintained.

The Management Plan must also provide the following information:

- a) at each airport where de-icing/anti-icing operations will be conducted, the position that is responsible for deciding when ground de-icing/anti-icing operations are to begin and when they are to end must be identified and fully described in a position description;
- b) the functions, duties, and responsibilities of flight crew, aircraft dispatchers, and management personnel must be specified, as well as the instructions and procedures to be followed for the safe dispatch or release of aircraft during ground icing conditions; and
- c) the position responsible for authorizing and coordinating the applicable portions of the Program with Air Traffic Control and airport authorities must be identified and described in a position description.

4.2 Maintenance

Where maintenance shares responsibility for the Program, the Management Plan must identify the position responsible for ensuring that sufficient competent personnel and adequate facilities and equipment are available at each airport where the Program may be applied. The functions, duties, and responsibilities of maintenance personnel must also be specified, as well as the instructions and procedures to be followed for the safe dispatch or release of aircraft during ground icing conditions.

Division II

Procedures

5.0 Aircraft De-icing/Anti-icing Procedures

In a well-organized, clearly identified, separate section of the appropriate manual, the operator's de-icing/anti-icing procedures must be described. In particular, the person responsible for a specific procedure must be identified, and procedures particular to a type of aircraft specified. The following minimum information must be covered in the operator's manual:

- a) a detailed description of the weather and aircraft surface conditions under which de-icing/anti-icing operations are required and the method whereby the Program is activated; and
- b) a detailed description of the procedures to be followed in the de-icing/anti-icing treatment process for each aircraft type. These procedures must be organized so as to minimize de-icing/anti-icing fluid application time and must specify the sequence in which critical surfaces are to be treated.

6.0 Holdover Timetables

The use of holdover timetables is not mandatory. Holdover timetables, as approved by the Director, Air Carrier, may be used either as guidelines or decision-making criteria in assessing whether it is safe to take off. When holdover timetables are used as decision-making criteria, only high confidence level times shall be used and the procedures to be followed after holdover time has expired must be clearly documented. Where applicable in a Program, an operator's manual will cover the following areas with regard to holdover timetables:

6.1 Responsibilities and Procedures

The operator's Program must define the following:

- a) the operational responsibilities of flight crew, flight watch system personnel, and maintenance and ground personnel;
- b) the procedures to be followed for the use of holdover timetables and the actions to be taken if holdover time is exceeded; and

- c) the procedures to be followed by ground and flight crew for establishing the start of holdover time.

6.2 Use of Holdover Timetables

Holdover timetables provide an estimate of the length of time de-icing/anti-icing fluids are effective. Because holdover time is influenced by a number of factors, established times may be adjusted by the pilot-in-command according to the weather or other conditions. Operators' manuals must describe the procedures to be followed for using holdover timetables. When the tables are used as decision-making criteria, the procedures to be followed by the pilot-in-command (PIC) for varying the established values must also be specified.

6.3 Take-Off After Holdover Times Have Been Exceeded

When holdover timetables are used as decision-making criteria, take-off after holdover times have been exceeded can occur only if a pre-take-off contamination inspection is conducted or the aircraft is de-iced/anti-iced again. The operator's Program must specify the procedures to be followed when holdover time is exceeded, and these procedures must appear in the appropriate manuals.

7.0 Aircraft Inspection and Reporting Procedures

When and where applicable, the operator's Program must document the guidelines and procedures to be followed by flight crew and other personnel for detecting contamination on the critical surfaces of aircraft. Included must be a description of the kinds of inspections permitted by the operator and at what point in the Program they must be conducted. These instructions must be aircraft specific.

The Program shall outline the responsibility of the PIC under CAR Section 602.11 to inform the cabin crew and passengers of the decision to have the aircraft de/anti-iced, when the decision is made. The method by which this information is conveyed may be standardized in the operator's program or left to the discretion of the PIC. It will also be clear that, if the aircraft is de/anti-iced prior to the boarding of passengers, no announcement to that effect is required.

7.1 Inspection Procedures

Two types of inspections, as defined in section 2.0 of these Standards, meet regulatory requirements. They are the Critical Surface Inspection and the Pre-take-off Contamination Inspection. Under icing conditions, the Critical Surface Inspection is mandatory; however, depending on the requirements of the operator's Program, the Pre-take-off Contamination Inspection may not be required. In its section on inspection procedures, the operator's manual must describe the techniques to be used

in contamination recognition and the conduct of the two types of inspection.

7.1.1 Contamination Recognition

Inspection procedures must describe the techniques to be used for detecting frost, ice, and snow and for determining if they are adhering to critical surfaces. These techniques must be specified in the operator's Program and may include the use of holdover timetables, tactile inspection, examination of one or more representative aircraft surfaces, or sensors.

7.1.1.1

Holdover timetables, approved according to the conditions outlined in section 6 of these Standards, may be used to determine, without a tactile or visual Pre-take-off Contamination Inspection, that critical surfaces are not contaminated.

7.1.1.2

Tactile inspection, under certain circumstances, may be the only way of confirming that the critical surfaces of an aircraft are not contaminated. This physical inspection shall be carried out by a qualified person and must include the leading edge and upper surface of the wings.

7.1.1.3

Examination of one or more representative aircraft surfaces may be used for the Pre-take-off Contamination Inspection, which does not require a tactile examination. This technique may be used when the aircraft manufacturer has identified representative aircraft surfaces that can be readily and clearly observed by flight crew during day and night operations and that are suitable for judging whether critical surfaces are contaminated or not.

If no representative aircraft surfaces have been identified by the aircraft manufacturer, an operator may offer one or more representative surfaces for approval by the Regional Manager, Commercial and Business Aviation or Chief, Airline Inspection; such a submission must be accompanied by technical data supporting the use of these surfaces as representative.
(amended 2000/09/01)

7.1.1.4

Sensors that provide information directly to the pilot-in-command may be used to determine whether critical surfaces are contaminated or not. The installation and use of sensors must meet applicable Transport Canada airworthiness and operational requirements. The procedures for use of sensors must be detailed in the operator's Program.

7.1.2 Critical Surface Inspection

This inspection is mandatory whenever ground icing conditions exist, and if the aircraft is de-iced/anti-iced, must take place immediately after final application of the fluid. After the inspection, an inspection report must be made to the pilot-in-command by a qualified person.

7.1.3 Pre-take-off Contamination Inspection

The operator's Program must describe the methods to be used in this inspection, which may be conducted from the inside or outside of the aircraft, which may be visual or tactile, and which may use representative aircraft surfaces to judge the extent of contamination. Where only a visual inspection is done, the operator's Program must specify the conditions, such as weather, lighting, and visibility of critical surfaces, under which such an inspection can be conducted. Unless other procedures have been specifically approved, a tactile external inspection must be conducted on all aircraft without leading edge devices, such as the DC9-10 and the F-28, and on any other aircraft as designated by the Director, Air Carrier.

7.2 Inspection Reporting

It is the pilot-in-command's responsibility to ensure that aircraft critical surfaces are not contaminated at take-off. When the pilot-in-command does not conduct the inspection, the delegated person must provide an inspection report in clear language to the pilot-in-command who must indicate that the report is complete and understood. A detailed description of the guidelines and procedures to be followed in communications between the inspector and the pilot-in-command, including the use of hand-signals, must be included in the appropriate operator's manual.

For the purposes of these Standards, there are two types of inspection reports, which correspond to the two types of inspections described above.

7.2.1 Critical Surface Inspection Report

This report must be made to the pilot-in-command and, if applicable, state the time at which the last full application of de-icing/anti-icing fluid began, the type of fluid used, the ratio of the fluid mixture, and, if the standard documented method was not used, the sequence in which the critical surfaces were de-iced/anti-iced. In addition, the report must confirm that all critical surfaces are free of contamination.

7.2.2 Pre-take-off Contamination Inspection Report

This report must be made to the pilot-in-command and, when the standard documented inspection method has not been used, must describe how the inspection was conducted and it must also confirm that all critical surfaces are free of contamination.

Division III

Training

8.0 Training and Testing

An operator's Ground Icing Operations Training Program shall include:

- a) initial and annual recurrent training for all operational and ground/maintenance personnel who have responsibilities within the program; and
- b) testing of crew members and other operations and ground/maintenance personnel who have responsibilities within the program.

8.1 Initial De-icing/Anti-icing Operations Training

Flight crew and other operations personnel who have responsibilities within the operator's Ground Icing Operations Program shall receive training in at least the following subjects, which are further described below:

- the effects of contamination on critical surfaces;
- aircraft de-icing/anti-icing procedures;
- aircraft inspection and reporting procedures; and
- the use of holdover timetables.

8.1.1 Training on the effects of contamination on critical surfaces, including:

- a) the reporting of contamination on arrival to the person responsible for coordinating the de-icing/anti-icing of aircraft;
- b) the effects of freezing precipitation, frost (including hoar-frost), freezing fog, snow, rain, and high humidity on cold-soaked critical surfaces and under wings;
- c) the identification, by aircraft type, of critical surfaces and, where applicable, representative aircraft surfaces;
- d) the types, purpose, characteristics and uses of de-icing/anti-icing fluids; and
- e) how de-icing/anti-icing fluids influence the performance and handling of aircraft, including their effect on rotation speeds, take-off distance, control pressures, stall margins, reduced thrust take-offs, and climb pitch attitudes, where applicable.

8.1.2 Training in aircraft de-icing/anti-icing procedures, including:

- a) the safety precautions to be observed during fluid application;
- b) the methods for applying de-icing/anti-icing fluid;
- c) the composition and identification of de-icing/anti-icing fluids;
- d) remote de-icing/anti-icing procedures, including aircraft-specific and location-specific procedures, where applicable; and
- e) the supervisory responsibilities of flight crew with regard to contractor services when the operator does not arrange for the training and qualification of contractor personnel. (See 8.5 Contractor Training)

8.1.3 Training in aircraft inspection procedures, which shall be aircraft specific, when necessary, and which shall include:

- a) identification of the critical surfaces and representative aircraft surfaces to be inspected;
- b) techniques for detecting and recognizing contamination on the aircraft;
- c) the different types of inspection techniques as well as when, where, by whom, and under what conditions (such as lighting and weather) they are to be used; and
- d) the communications procedures to be followed by flight crew when contacting ground personnel, Air Traffic Control, or company station personnel to coordinate aircraft inspections.

8.1.4 Training in the use of holdover timetables, both when used for guidance and as decision-making criteria. For training in the use of holdover timetables as decision-making criteria, all of the following shall be covered. Only the first four items must be taught when holdover timetables are used for guidance. Training in the use of holdover timetables shall include:

- a) the source of holdover timetable data;
- b) instruction in precipitation category, precipitation intensity, and the relationship of a change in precipitation to holdover time;
- c) the relationship between holdover time and different fluid concentrations for all types of fluid used;
- d) the definition of when holdover time begins and ends;

- e) communications procedures, which covers how to inform flight crew of the type of fluid used, start time of final fluid application, and any requirements for coordination with other agencies; and
- f) the procedures to be followed when holdover time is exceeded, including inspection requirements, alternate means for determining whether surfaces are contaminated, and the requirements governing repeat de-icing/anti-icing.

8.2 Recurrent De-icing/Anti-icing Operations Training

Recurrent training must be given on an annual basis and shall include a review of current de-icing/anti-icing operations and inspection procedures. This training must highlight changes in procedures and cover the latest available research and development information on ground de-icing/anti-icing operations. Prior to the commencement of winter operations, the operator should distribute a ground de-icing/anti-icing operations information circular to all affected personnel reviewing procedures and presenting any new information not covered in the annual recurrent training.

8.3 Initial Ground/Maintenance Personnel Training

Ground/maintenance personnel who have responsibilities within the operator's Ground Icing Operations Program shall receive training in at least the following three subjects:

8.3.1 Training on the effects of surface contamination, including:

- a) the items listed in Section 8.1.1 excluding 8.1.1e);
- b) specific information on the effects of contamination on ram-air intakes and instrument pick-up points; and
- c) potential damage to engines by foreign objects.

8.3.2 Training in aircraft de-icing/anti-icing procedures, including:

- a) the items listed in Section 8.1.2 excluding 8.1.2e);
- b) a description of and the qualifications required for the operation of various types of equipment;
- c) instruction in the operation of de-icing/anti-icing equipment; and
- d) the determination of the start of holdover time.

8.3.3 Training in aircraft inspection procedures, which shall be aircraft specific, when necessary, and which shall include:

- a) the items listed in Section 8.1.3 excluding 8.1.3d); and
- b) the inspection techniques for conducting a Critical Surface Inspection.

8.4 Recurrent Ground/Maintenance Personnel Training

Recurrent training must be given on an annual basis and shall include a review of current de-icing/anti-icing operations and inspection procedures. This training must highlight changes in procedures and cover the latest available research and development information on ground de-icing/anti-icing operations. Prior to the commencement of winter operations, the operator should distribute a ground de-icing/anti-icing operations information circular to all affected personnel reviewing procedures and presenting any new information not covered in the annual recurrent training.

8.5 Contractor Training

An operator who contracts de-icing/anti-icing services from another organization is responsible for ensuring that the training program of the contractor and application of de-icing/anti-icing operations standards meet the operator's own Ground Icing Operations Program criteria. Through the operator, the contractor's procedures and training programs shall be documented.

8.6 Testing

After both initial and recurrent training, the operator's Program must ensure that all personnel are tested on all information covered in the training program. Records documenting the initial and annual recurrent training of each person must also be maintained.



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CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 622.131 - PILOT ASSESSMENT OF RUNWAY VISIBILITY

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**STANDARD 622.131 — PILOT
ASSESSMENT OF RUNWAY VISIBILITY**

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PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 622.131 — PILOT ASSESSMENT OF RUNWAY VISIBILITY

(amended 2006/12/01)

(1) Runway visibility is assessed while stationary at the runway threshold take-off point, at the taxiway holding position for the taxiway adjoining the runway threshold, or at a point adjacent to the runway threshold.

(2) When assessing runway visibility, a pilot:

(a) assesses, in the runway direction, the furthest visible runway edge lights or landmarks within 10 degrees of the runway centreline that can be seen and recognized;

(b) from the assessment in paragraph (a), determines the distance (in feet) based on a 200 foot runway edge light spacing or using the applicable Aerodrome Chart published in the *Canada Air Pilot* (CAP); and

(c) immediately reports the distance assessed to ATS, if available, or to the inquiring party, as the runway visibility along the specified runway in the following format:

“RUNWAY VISIBILITY, RUNWAY [*runway number*] ASSESSED AS [*distance assessed*] FEET AT [*time*] UTC”, to the nearest 100 foot increment.

(3) If the runway visibility varies during the assessment, the pilot reports the lowest value observed.

(4) The lowest reported value is 200 feet, with lower values reported as “...LESS THAN 200 FEET...”.

(5) The highest reported value is 6,000 feet, with higher values reported as “...GREATER THAN 6,000 FEET...”.



CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

***STANDARD 623 - SPECIAL FLIGHT OPERATIONS
DIVISION I - SPECIAL AVIATION EVENTS***

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STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS

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STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER ONE - AIR SHOWS

Foreword

These *Special Flight Operations Standards - Special Aviation Events - Air Shows* are the standards that have to be met for the issue and continuing validity of a special flight operations certificate issued for an air show as provided for in the *Canadian Aviation Regulations* (the "CARs"), Subpart 603, Division I.

For ease of reference to the CARs, the divisions and numbers of the standards are in general assigned to correspond to those of the CARs. Therefore, section 623.02 of the standards would reflect a standard required by section 603.02 of the CARs.

In support of the standards and for clarification, additional information may be found in the Information Notes, diagrams and appendices contained in these standards. The diagrams are provided for illustrative purposes only. In case of conflict or inconsistency between the information provided in the diagrams and the standards, the standards take precedence.

The Minister of National Defence has authority over all military performances in air shows. Accordingly, the standards recommend co-ordination procedures with the Department of National Defence for air shows involving military performances.

Additional information on the organization and administration of an air show may be obtained by contacting your local Regional General Aviation Office of Transport Canada Civil Aviation or by writing to:

Transport Canada
Chief, Recreational Aviation and Special Flight Operations (AARRD),
Place de Ville, 330 Sparks St.,
Ottawa, Ontario K1A 0N8

For additional information on suggested procedures and on issues that are not related to the CARs, such as air show planning and organization, publicity, marketing, air show performers and related matters, please contact:

International Council of Air Shows Inc. (ICAS)
751 Miller Drive SE, Suite F-4
Leesburg, Virginia, USA
20175

Phone: 703-779-8510
FAX: 703-779-8511
Email: icas@airshows.org

PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER ONE - AIR SHOWS

(amended 2004/12/01)

623.00 *Interpretation*

In these Standards:

“accident” means a reportable aviation accident as defined in the *Transportation Safety Board Regulations*; (*accident*)

“aerobatic box” means the airspace at an air show where participating aircraft are authorized to perform air show aerobatic manoeuvres; (*zone aérienne de voltige*)

“air show aerobatic manoeuvre” means a manoeuvre where a change in the attitude of an aircraft results in a bank angle greater than 75 degrees or in a pitch attitude greater than 60 degrees above or below the horizon, including a roll, loop, spin, hammerhead turn, tail slide, and a lomcevak; (*faisant partie d'un spectacle aérien*)

“air show” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, an aerial display or demonstration before an invited assembly of persons by one or more aircraft; (*spectacle aérien*)
(amended 2006/06/30)

“air show demonstration area” means the total airspace, illustrated in Diagram 1, that is reserved for an air show and identified as such in the NOTAM issued for the air show; (*zone de manifestation aérienne*)

Information Note:

For an illustration of an air show demonstration area, refer to Diagram 1.

“movement area” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, a part of an aerodrome that is intended to be used for the surface movement of aircraft, and includes the manoeuvring area and aprons; (*aire de mouvement*)
(amended 2006/06/30)

“Category I aircraft” means an aircraft flown at a true airspeed in excess of 245 knots; (*aéronef de catégorie I*)

“Category II aircraft” means an aircraft flown at a true airspeed of 156 knots to 245 knots inclusive; (*aéronef de catégorie II*)

“Category III aircraft” means an aircraft flown at a true airspeed less than 156 knots; (*aéronef de catégorie III*)

“crowd line” means a physical barrier or a line marked on the ground that serves as a restraining line; (*ligne délimitant l'accès à la foule*)

“essential personnel” means persons who are authorized access by the certificate holder to the flying display area, including the aerobatic box, during an aerobatic performance. Examples of essential personnel include Transport Canada monitors, Crash Fire Rescue personnel, pole-holders, pyro-technicians, essential support crew and Air Traffic Services personnel; (*personnel essentiel*)

“flyby” means a non-aerobatic pass or a series of non-aerobatic passes performed by one or more aircraft at an air show; (*défilé aérien*)

“fly-in” means a prearranged meeting of a number of aircraft at a specified aerodrome which will take place before an invited assembly of persons and at which no:

(a) competitive flying; and

(b) aerial demonstration will take place; (*rassemblement d'aéronefs*)

“fly-past” means a non-aerobatic pass performed by one or more aircraft as an integral part of an aerobatic routine at an air show; (*passage en vol*)

“flying display area” means that airspace at an air show site where participating aircraft perform but excludes ingress and egress routes; (*zone d'évolution en vol*)

Information Note:

For an illustration of a flying display area, refer to Diagram 1.

“formation flight” means a flight by aircraft participating in an air show where an aircraft is flown primarily with reference to another aircraft; (*vol en formation*)

“hover taxi” means the movement of a helicopter conducted above the surface and in ground effect, at airspeeds less than 20 knots; (*circulation près du sol*)

“incident” means a reportable aviation incident as defined in the *Transportation Safety Board Regulations*; (*incident*)

“invited assembly of persons” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, any number of persons who have been invited, by any means, to attend a special aviation event. The term excludes competition judges, the holder of a special flight operations certificate, members of a certificate holder's staff and members of a participant's support team; (*rassemblement de personnes invitées*)
(amended 2006/06/30)

“key event personnel” means a person or persons having original or delegated responsibility for the air, ground, safety and emergency operations at an air show; (*personnel clé de la manifestation*)

“maximum permissible take-off weight” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, the maximum take-off weight for an aircraft as authorized by the state of registry of the aircraft or as provided for in the aircraft type certificate; (*masse maximale admissible au décollage*)
(amended 2006/06/30)

“non-demonstration helicopter operations” means any helicopter operation that takes place in the vicinity of a primary or secondary spectator area at a special aviation event site in respect of which a special flight operations certificate for the air show has been issued. Such non-demonstration operations are not required to be authorized in the special flight operations certificate issued for the air show; (*opérations aériennes en hélicoptère ne faisant pas partie des démonstrations du spectacle*)

“NOTAM” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, a notice to airmen concerning the establishment or condition of, or change in, any aeronautical facility, service or procedure, or any hazard affecting aviation safety, the knowledge of which is essential to personnel engaged in flight operations; (*NOTAM*)
(amended 2006/06/30)

“participant” means an air show performer, including any other person involved in the conduct of a performance at an air show, namely a member of a flight crew, flight crew support staff, a parachutist, a ground performer such as a member of a pyrotechnic team, an announcer and, where applicable, Air Traffic Services personnel. The term excludes a member of the management organization of an air show; (*participant*)

“primary spectator area” means one or more areas in which an invited assembly of persons will be positioned to view a special aviation event. It is bounded by the crowd line and has lateral limits that are visibly well defined; (*zone primaire réservée aux spectateurs*)

Information Note:

For an illustration of a primary spectator area, refer to Diagram 1.

“secondary spectator area” means an area adjacent to the flying display area, where persons may congregate to observe a special aviation event. This includes, but is not limited to, private property or property not under the control of the certificate holder, public roads and rights of way; (*zone secondaire de spectateurs*)

“show centre” means a visible reference point along the show line usually denoting the centre of the aerobatic box. (*axe du spectacle*)

“show line” means a line on the surface of the ground or water, marked to be clearly visible to pilots from the air, intended to enhance pilot orientation during the performance; (*ligne de limite du spectacle aérien*)

“true airspeed” means, for the purposes of the definitions of Category I aircraft, Category II aircraft and Category III aircraft:

(a) in the case of a reciprocating-engine powered aeroplane, the airspeed achieved in straight and level flight at 75 percent power, in standard atmospheric conditions and at maximum permissible take-off weight; and

(b) in the case of a turbine engine powered aeroplane, excluding the BD-5J Microjet, the airspeed achieved at 85 percent of the maximum continuous power, in straight and level flight, in standard atmospheric conditions and at maximum permissible take-off weight; (*vitesse vraie*)

623.01 *Reserved*

**623.02 *Issuance of a Special Flight Operations
Certificate - Special Aviation Event***

(1) Pursuant to section 603.02 of the CARs, the following information, constitutes an application to conduct an air show:

(a) the name, location and date of the air show;

(b) the expected number of invited spectators, fly-in aircraft and vehicles;

(c) the name, address, telephone and facsimile numbers of the certificate holder;

(d) the names, addresses, telephone and facsimile numbers of the officials forming part, under paragraphs 623.05(1)(b) and (c), of the air show management organization;

(e) a breakdown of the proposed participating aircraft by categories as follows: Canadian civil, Canadian military, foreign civil and foreign military; and

(f) a site diagram of the air show site on a 1:24,000 topographic chart or aerial photograph, and clearly indicating at least the following:

(i) the location and marking of the show lines and show center,

(ii) the location of the boundaries of the air show demonstration area,

(iii) the location of the boundaries of the flying display area or aerobatic box, or both if aerobatics will be conducted at the air show,

(iv) the location of the primary spectator areas and the types of barrier around them, including gates,

(v) the location of the emergency vehicles,

(vi) the location of the medical facilities,

(vii) the location of the emergency access surface routes to and from the air show site;

(viii) the location of the aircraft movement areas,

(ix) the location of the parachuting drop zone, if any,

(x) the location of the static display aircraft parking areas,

(xi) the location of the air show aircraft parking areas,

(xii) the location of the fly-in aircraft parking areas,

- (xiii) the location of the refuelling areas,
- (xiv) the location of the helipads,
- (xv) the location of the air show central control, and
- (xvi) the location of the pyrotechnic areas.

Information Note:

For an illustration of an air show site, refer to Diagram 1.

(2) The application is submitted to the appropriate Transport Canada Regional General Aviation office sixty (60) days prior to the proposed date of the air show to allow sufficient time to process the application.

(3) The following information is submitted to the appropriate Transport Canada Regional General Aviation office in support of the application submitted under subsection (1) no later than ten (10) working days prior to the date of the proposed air show to allow sufficient time to process the application:

Information Note:

In cases where unforeseen logistical problems arise and an applicant cannot meet the time requirements pursuant to subsections (2) and (3), an applicant should contact the appropriate regional General Aviation office. Where time allows for a complete evaluation of the application, it may be possible to obtain a certificate, but applicants should be aware that not meeting the 60 day or 10 day requirements could result in the non-issue of a certificate.

- (a) a completed *Special Aviation Event Flight Program* (form 26-0374 set out in Appendix B) identifying all anticipated participants;

Information Note:

An alternate format may be used, providing that it contains all the information required by form 26-0374.

- (b) for each foreign pilot, a legible copy of the pilot's licence and medical certificate;
- (c) for each aerobatic performer, a sequential listing of all manoeuvres to be flown by the performer, including:
 - (i) the distance of each manoeuvre from spectator areas, including, where applicable, the point of entry into and recovery from each manoeuvre,
 - (ii) the point of entry to, and departure from, the flying display area, where applicable,
 - (iii) the directions of flight relative to the spectator areas,
 - (iv) the location of water drops, pyrotechnics, helicopter rappelling and similar operations relative to the spectator areas,
 - (v) the maximum and minimum speeds for the entire performance, and

- (vi) the minimum altitudes for each manoeuvre to be performed;
- (d) where applicable, a legible copy of each performer's:
 - (i) Transport Canada "Statement of Aerobatic Competency" (form 26-0307),
 - (ii) FAA (United States) "Statement of Acrobatic Competency" (form 8710-7), or
 - (iii) aerobatic competency certificate equivalent to (i) and (ii) above and recognized by Transport Canada; and
 - (iv) favourable assessment referred to in paragraph 623.06(1)(e) of the manoeuvres referred to in paragraph 623.07(14)(c) from either Transport Canada or the FAA (United States).
- (e) for foreign aircraft with non-standard flight authorities, a Canadian validation of the aircraft's foreign flight authority pursuant to section 507.05 of the CARs;
- (f) for information purposes, a copy of the emergency plan referred to in section 623.05;
- (g) for information purposes, a copy of the air show's proposed air display traffic control procedures referred to in paragraph 623.05(4)(a); and
- (h) where applicable, a completed application to conduct a parachute descent referred to in section 623.38.

623.03 & 623.04 Reserved

623.05 Event Management

Information Note:

(i) The management structure of an air show will vary according to circumstances. A small air show may be organized by a local flying club while a large air show will require the services of a number of persons with expertise in a variety of areas. The scope of any air show will depend on the aviation interests of the community and other local conditions.

(ii) It is most important that a certificate holder be aware that, since the Minister issues the special flight operations certificate - air show to him/her, it is his/her responsibility to ensure that the air show is conducted in such a way that the safety of persons and property on the ground is not jeopardized. In this regard, air show performers are aware of the hazards to themselves, but Transport Canada, by means of the CARs and Special Flight Operations Standards pertaining to Special Aviation Events, establishes standards of safety for the protection of the general public.

(1) Management Organization

The standards to meet, pursuant to section 603.05 of the CARs, for the management of a special aviation event - air show are as follows:

- (a) An applicant for a special flight operations certificate issued for an air show may be an individual, a group of individuals or an organization incorporated under the laws of either Canada or a province;
- (b) The management organization includes the person clearly identified as having overall responsibility for ensuring compliance with the general and the specific conditions specified in the special flight operations certificate - Special Aviation Event, issued pursuant to section 603.02;
- (c) The person having the responsibility outlined in paragraph (b) above is responsible for the safety related activities specified in paragraph (d) below and may assign other persons the necessary authority to exercise duties in respect of the organization of, and supervision and operational control over, aspects of the air show listed in subparagraphs (d)(ii) to (v) below:

Information Note:

At a small air show, one person may be able to coordinate more than one activity, while at a large air show, an activity may be controlled by a committee of persons whose chair has been assigned the appropriate authority.

It is not the intent of these standards to confine a certificate holder to a mandatory management structure. The management structure (position titles) outlined in the following section is not mandatory, but has served as an adequate model to date in Canada. A certificate holder may or may not wish to use these position titles, however the responsibilities are mandatory.

- (d) The responsibilities for safety related activities in respect of which a special flight operations certificate issued for an air show are as follows:

- (i) the certificate holder is responsible for:

- (A) ensuring that the responsibilities in (ii) through (v) have been assigned to appropriately qualified persons,
 - (B) providing a sufficient number of capable and informed persons to handle the operation of the air show with efficiency and safety, and for their identification as officials, including persons having assigned responsibility for flight and ground operations and air show safety,
 - (C) appointing a person selected for his or her broad background in aviation operations and ability to coordinate the various air, ground, safety and administrative activities at a special aviation event,

(D) establishing liaison with the aerodrome management and local agencies concerned with the air show,

(E) studying aerodrome facilities and accommodation and preparing a draft plan for the safe handling of spectators, aircraft, automobiles and other vehicles expected on the air show site, on a comprehensive, overall basis, and

(F) making the necessary application to the appropriate Transport Canada Regional General Aviation office within the time limits referred to in section 623.02, in order to complete the administrative and coordination duties required to prepare the special flight operations certificate for the air show,

(ii) the program director is responsible for the overall coordination of activities at the air show, including:

(A) ensuring all air show personnel are properly informed of their duties and responsibilities in detail, well in advance of the air show date,

(B) in consultation with the person in charge of the flight operations at the air show, generally the flight operations director, cancelling or postponing the flight program in the air show in the case of an incident or accident, bad weather, or any other circumstances relating to the safety of the spectators or participants, and

(C) ensuring that prior practice or rehearsals at the air show site that are considered necessary by performers, are included in the special flight operations certificate issued for the air show and that emergency services are available,

Information Note:

Other duties for the program director may include:

- establishing liaison with resident aircraft operators and scheduled air carriers to coordinate the flight program to avoid disruption to commercial service;

- arranging for customs service at airports which are not ports of entry, if sufficient trans-border visitors are expected;

- making prior arrangements with participating pilots and crew arriving by air concerning arrival dates, accommodation, customs, program performance, flight authority, etc.

(iii) the flight operations director is responsible for the conduct of the flight operations at the air show, including:

(A) finalizing the flight program in accordance with the conditions of the special flight operations certificate issued for the air show

(B) obtaining and reviewing flight routines from all participants to ensure that their routines are in conformity with the requirements of these standards and suitable for the air show site,

- (C) submitting the information referred to in clause (B) to the appropriate regional Transport Canada Regional General Aviation office as part of the information required to be submitted under section 623.02,
- (D) ensuring that each civilian participating in the air show holds the appropriate license, certificate and authorization, and is competent to conduct his or her performances in accordance with the special flight operations standards and the special flight operations certificate issued for the air show. These aviation documents include a pilot license or a certificate endorsed with aircraft type ratings and the medical certificate required under Part IV of the CARs, as well as a Statement of Aerobatic Competency (form 26-0307) and, for a parachutist, an Exhibition Jump Rating issued by the Canadian Sport Parachuting Association, a demo rating issued by the Canadian Associates of Professional Skydivers or a pro rating issued by the United States Parachuting Association,
- (E) where applicable, establishing liaison with military participants and the military air display director,
- (F) providing a briefing area of adequate size to accommodate the persons being briefed in accordance with section 623.09 of these standards,
- (G) liaising with NAV CANADA and Transport Canada with regard to the class, timing and contents of the NOTAM required to be published for the air show, and

Information Note:

Normally, such NOTAM covers at least the horizontal and vertical limits of airspace, and the duration of the air show.

- (H) conducting a participants' briefing in accordance with the requirements of section 623.09, and ensuring that performers who do not attend this briefing do not participate in the air display covered in the briefing,
- (I) during an air display, the flight operations director is to:
 - (I) be stationed so as to have an unrestricted view of the flying display area,
 - (II) terminate any performance or demonstration that, in his or her opinion, is being conducted in an unsafe manner,
 - (III) have ready communication with other air show officials, air traffic control personnel and any other persons having responsibility over the safe and proper conduct of the air show, and
 - (IV) be readily accessible to all pilots taking part in the flying program and to air show officials,

(iv) the ground operations officer is responsible for crowd control, automobile and aircraft parking, and liaison with his or her airport and local governing counterparts, including:

- (A) ensuring that sufficient personnel are available to effectively control the anticipated crowd and providing these persons with complete instructions as to their duties,
- (B) arranging for communications facilities, including air to ground and ground control communications and those required by personnel controlling the air display or the spectators, and arranging for the use of special radio frequencies, if required,
- (C) arranging for the availability and use of support vehicles such as first response vehicles for responding to emergencies, aircraft “*follow me*” vehicles, shuttle buses to move spectators from parking to viewing areas,
- (D) establishing an operations centre, in conjunction with other key event officials, to coordinate and control the activities he or she is responsible for,

Information Note:

Other duties to assign to the ground operations officer, depending on the circumstances, are:

(i) establishing effective liaison with the airport operator and local police to ensure that adequate facilities can be provided for spectators, and to provide for off-site traffic control; and

(ii) arranging for refuelling of aircraft, both participating and visiting, and establishing liaison with military participants.

(v) the air show safety officer is responsible in cooperation with the ground operations officer for ensuring that the emergency procedures referred to in section 623.05 are developed in concurrence with and approved by the delegated agency having jurisdiction over the air show site, namely,

- (A) in the case of an air show conducted at an aerodrome or airport, the aerodrome or airport authority, as the case may be, and
- (B) in the case of an air show conducted over water, the Coast Guard, a Harbour Authority or local law enforcement authorities.

Information Note:

The scope of the responsibilities concerning air show safety will vary in accordance with the size of the air show and its location.

As a minimum, air show Emergency Procedures should include:

(i) arranging for the presence of crash/fire/rescue vehicles and personnel appropriate to the size of the air show;

- (ii) arranging for the possible reception of accident casualties at local hospitals;*
- (iii) arranging for the availability of medical personnel and evacuation vehicles appropriate to the size of the air show;*
- (iv) ensuring that all persons, including crowd control personnel and the public address announcer, who may be required to respond to emergency situations, are briefed and provided with written instructions well in advance of the air show;*
- (v) establishing a control centre from which activities at the air show can be monitored and emergency activity can be coordinated, if required;*
- (vi) ensuring, in cooperation with the ground operations officer, the availability of emergency access routes and the personnel to ensure that they remain clear; and*
- (vii) the production and placement of signs and instructions to the public regarding accident, fire, injuries, lost children, no smoking areas, etc.*

(2) Emergency Plan

A certificate holder is responsible for:

- (a) developing an emergency plan describing the personnel and equipment available to respond to anticipated emergencies, including incidents and accidents, or a medical emergency involving a spectator;*
- (b) communicating the plan to air show personnel and, where applicable, the air traffic service provider; and*
- (c) having the equipment and personnel described in the emergency plan in place for the air show.*

Information Note:

- (i) Airports have emergency plans and procedures in place. A certificate holder should coordinate with the airport manager or authority to develop an addendum to the existing plans and procedures for the air show. The airport manager/authority and provincial or local governments set the requirements for medical facilities and personnel at public gatherings. Local police and hospitals should be aware of the air show dates and the expected size of the crowd.*
- (ii) A certificate holder should be aware of the legislation regarding incidents and accidents (see the definitions of these terms in section 623.00) and that the release of names in fatal accidents is at the discretion of the Coroner. A certificate holder should designate a single spokesperson to deal with the media should problems occur.*

(3) Crowd Control

Information Note:

- (i) Control or lack of control in the handling of spectators can result in either an orderly*

assembly of people or an undisciplined crowd that is potentially dangerous to itself or to aircraft. A properly controlled crowd can only result from thorough planning and the provision of adequate facilities and personnel.

(ii) The majority of air shows are held at aerodromes and the major factors affecting crowd control are addressed accordingly. For those air shows that are held at other locations, several of these factors may not apply.

Pursuant to subparagraph 603.05(a)(i) of the CARs, this section specifies the supervision and operational control measures necessary to ensure the safety and orderly conduct of persons attending an air show.

(a) Primary Spectator Area

The certificate holder is responsible for ensuring that:

- (i) the crowd line and the lateral limits of a primary spectator area are laid out so that no spectator is closer to any aircraft in flight, taking off, landing or performing than the minimum distance specified in section 623.07,
- (ii) a primary spectator area is isolated from any aircraft movement area.

Information Note:

Subparagraph (ii) above is predicated on the fact that propeller or jet blast, or rotor downwash can cause injuries to persons or damages to property nearby.

(b) Aircraft and Vehicle Parking

The certificate holder is responsible for ensuring that:

- (i) where the certificate holder has arranged for aircraft participating in the air show to be on static display to the public prior to the air show, the static display area is considered as a manoeuvring area and, during the execution of any flight program of the air show, all non-participants are kept out of such area,
- (ii) any fly-in aircraft or vehicle parking area that cannot be kept clear of spectators during the execution of a flight program is considered to be a secondary spectator area to which the minimum distance and altitude provisions of these standards apply.

(c) Crowd Control Personnel

The certificate holder is responsible for ensuring that crowd control personnel:

- (i) are in sufficient numbers and available at the air show site during the execution of a flight program,
- (ii) are briefed on crowd control and emergency procedures, and
- (iii) are clearly distinguishable from other officials, from essential personnel and from spectators.

Information Note:

(i) Crowd control personnel should be adults and wear some form of distinctive clothing (e.g. jacket, vest, t-shirt) that clearly identifies them as such. A small coloured nametag or similar device may be difficult for a lost child or disoriented person to identify.

(ii) Properly briefed adults should be employed for crowd control in restricted and spectator enclosure areas. Youth groups, if properly utilized and directed, can be of great public assistance for direction, vehicle parking, etc.

(d) Fencing and Barriers

The certificate holder is responsible for ensuring that adequate separation can be, and is in fact, maintained during the execution of any flight program between spectators and show lines, aircraft movement areas and access routes for emergency vehicles.

Information Note:

There are no specific requirements regarding the type of fence used, but a certificate holder should ensure that if, for example, a rope barrier is used, sufficient crowd control personnel are on duty to ensure that the spectators remain behind it.

(e) Emergency Entrances, Access Lanes and Exits

The certificate holder is responsible for ensuring that:

- (i) emergency entrances, access lanes and exits are available to and from the air show site, and
- (ii) procedures are in place to keep them clear in an emergency situation.

(f) Public Address System

The certificate holder is responsible for ensuring that:

- (i) a public address system or other means of communicating instructions to spectators is in place for use in normal circumstances and in the event of an emergency, and
- (ii) the public address announcer is thoroughly briefed on emergency procedures and is prepared to assist in crowd control when required by the certificate holder in the event of an emergency.

(g) Site Cleanliness**Information Note:**

(i) Trash discarded by spectators can be a hazard to persons or to aircraft. Cans, cups, or other objects can be turned into projectiles by rotor downwash, propeller or jet blast and can cause severe damage to aircraft engines, if ingested.

(ii) It has been noted that, at air shows where the public address announcer describes the potential hazards and then reminds them from time to time, the spectators have been

cooperative in depositing their trash in the receptacles provided. This has the additional benefit of reducing the costs of clean up.

(4) Air Display Traffic Control

The certificate holder is responsible for ensuring that:

(a) where Air Traffic Services are provided at the air show, air display traffic control procedures are developed in co-operation with the affected ATS units;

Information Note:

(i) At aerodromes with established Air Traffic Services, any additional requirements associated with a special aviation event - air show will normally be on hand or readily available. Where temporary control service is required, timely arrangements have to be made to ensure that the required facilities, equipment and manpower can be made available.

(ii) Temporary control service is normally provided from a mobile control tower, van or station wagon equipped with the appropriate facilities. It is essential that the control unit be situated so as to permit the controller an unobstructed view of the approach to the airport and the landing areas.

(b) where the air show takes place at an aerodrome where NORDO aircraft will be operating, a visual means of indicating the runway in use and the landing direction is in place, readily visible from the air and of the variable type that can be realigned to indicate a change in the landing direction; and

(c) a method of communication is established between himself or herself and Air Traffic Services personnel.

Information Note:

(i) The communication requirement specified in paragraph (a) may be met by the use of a portable radio, a field telephone, etc. While not all air shows will require the presence of Air Traffic Services staff, careful attention should be given to providing adequate communication between air show aircraft and the person responsible for flight operations.

(ii) Where a certificate holder wishes to operate a radio station for any purpose, he or she is required under the Radiocommunication Act to select a frequency and apply to Industry Canada, using form DOC 16-16(682), "Application for Licence to Install and Operate a Radio Station in Canada". Selection of the frequency or frequencies is required under the Radiocommunication Act legislation to be mutually arranged between the concerned aeronautical advisory agency, the special flight operations certificate holder and Industry Canada.

(iii) Certificate holders are reminded that any operator of such a station is required under the Radiocommunication Act to be the holder of a radiotelephone operations restricted certificate. To assist air show organizers in arranging for communication control facilities, the following

VHF frequency selection guide is available for use. This selection guide includes air show sites at aerodromes and at other locations as follows:

- (A) with a flight service station or community aerodrome radio station, the mandatory frequency (MF);*
- (B) with an ATF, the frequency of the ground station or 123.2 KHz where a ground station does not exist;*
- (C) with a private advisory station, the UNICOM frequency of the ground station;*
- (D) where none of the above frequencies is suitable, an air show control station can be established to operate on one of the aviation instruction frequencies: 123.3, 124.4 or 123.5 KHz.*

623.06 Participant and Aircraft Eligibility

(1) Participant Eligibility

Pursuant to section 603.06 of the CARs, to be eligible to operate an aircraft in an air show, each flight crew member has to meet the following requirements:

- (a) hold a pilot licence and medical certificate appropriate to the aircraft to be operated in the air show;*
- (b) to conduct solo air show aerobatic manoeuvres, be in possession of one of the following documents:*
 - (i) a Transport Canada "Statement of Aerobatic Competency" (form 26-0307),*
 - (ii) an FAA "Statement of Acrobatic Competency" (form 8710-7), or*
 - (iii) an aerobatic competency certificate equivalent to (i) and (ii) above and recognized by Transport Canada;*
- (c) to conduct formation air show aerobatic manoeuvres as part of an aerobatic team:*
 - (i) be in possession of one of the following documents on which is annotated "Formation":*
 - (A) a Transport Canada "Statement of Aerobatic Competency" (form 26-0307),*
 - (B) an FAA "Statement of Acrobatic Competency" (form 8710-7), or*
 - (C) an aerobatic competency certificate equivalent to (i) and (ii) above and recognized by Transport Canada, and*
 - (ii) have within the preceding 12 months;*
 - (A) performed with the other members of the formation in 8 aerobatic performances,*
 - or*

(B) carried out a minimum of 25 aerobatic practice sessions with the other members of the formation;

(d) to conduct formation non-aerobatic manoeuvres:

(i) as pilot-in-command of the aircraft, be experienced in flying in formation in the aircraft intended for the flight,

(ii) in a formation flight of four aircraft or less, have practiced the non-aerobatic manoeuvres with the other members of the formation within the previous 30 days prior to the air show,

(iii) in any formation larger than four aircraft:

(A) have flown the formation's proposed sequences at an authorized air show in Canada or the U.S., within the 15 days prior to the air show, or

(B) have practiced the proposed sequences within 15 days prior to the air show, and

(iv) have attended, in addition to the briefing referred to in section 623.09, a briefing or review conducted by the formation leader or other designated formation member and attended by a representative of the certificate holder, preferably the person in charge of flight operations, covering at least the following subjects:

(A) designation of formation leader and alternate leaders, and selection of manoeuvres to be performed and their sequence,

(B) formation positions,

(C) alternate positions in case of aborts,

(D) radio procedures and call signs,

(E) visual signals,

(F) expected speeds and power settings,

(G) take-off and turn out,

(H) join up and break, and

(I) emergency procedures; and

(e) to conduct the types of manoeuvres referred to in paragraph 623.07(14)(c) below, each individual performer has received a favourable assessment of the manoeuvres from either Transport Canada or the FAA (United States).

Information Note:

(i) The favourable assessment referred to above indicates that the manoeuvres have undergone a risk analysis process and the associated risks are mitigated by way of conditions contained in the assessment report. An assessment report is valid only for the person named in the report

and only for the period specified in the assessment report.

(ii) In Canada, an assessment may be obtained by writing to:

*Transport Canada
Chief, Recreational Aviation and Special Flight Operations (AARRD),
Place de Ville,
330 Sparks St.,
Ottawa, Ontario
K1A 0N8*

(2) Aircraft Eligibility

For an aircraft to be eligible to participate in an air show, the aircraft owner or operator provides proof to the certificate holder of:

- (a) a valid certificate of registration issued in respect of that aircraft by a contracting state;*
- (b) one of the following valid flight authorities issued in respect of that aircraft:*
 - (i) a Canadian Certificate of Airworthiness, Special Certificate of Airworthiness in the Limited, Amateur-built or Owner Maintenance classification, or flight permit - Specific Purpose issued under section 507 of the CARs,*
 - (ii) standard certificate of airworthiness issued by the state of registry, or*
 - (iii) Canadian validation of a foreign non-standard flight authority issued under section 507.05 of the CARs, a Special Certificate of Airworthiness issued under section 507.03 of the CARs or a flight permit issued under section 507.04 of the CARs;*
- (c) in the case of a basic ultra-light aeroplane, advanced ultra-light aeroplane or foreign equivalent, or a hang glider, in respect of which a flight authority has not been issued, the fact that the aircraft has been found eligible and authorized to participate in accordance with section 603.06 of the CARs; and*
- (d) that the aircraft has been approved by the state of registry, to carry out all the manoeuvres to be conducted at the air show, by means of a type certificate, or otherwise approved by the country in which the aircraft is registered.*

Information Note:

(i) Operators of foreign civil aircraft with non-standard flight authorities are required under section 507.04 of the CARs to obtain a Canadian validation of a foreign flight authority prior to entering Canadian airspace. A Canadian validation may be obtained by providing the following information to the appropriate Transport Canada Regional office:

- (a) a clear and legible copy of the aircraft's certificate of registration,*
- (b) a clear and legible copy of the aircraft's flight authority, including all operating conditions and limitations, and*

(c) the planned itinerary for the aircraft while in Canada, including dates and point of entry and departure from Canadian airspace.

(ii) Pursuant to section 104.01 of the CARs, where the Minister has not issued a standardized validation, the application for a validation of a foreign flight authority includes the applicable fees.

(iii) Although the responsibility for applying for a Canadian validation rests with the owner of the foreign aircraft, a certificate holder may coordinate compliance with this requirement in order to avoid confusion, last minute delays, or possible enforcement action against a pilot who flies such an aircraft in Canada without authority. Normally, performers who participate in several air shows across Canada will obtain a validation for the entire season from the Transport Canada office serving the region where the aircraft first participates in a special aviation event.

Military Aircraft

Information Note:

(i) While in Canada, foreign military aircraft operate under the authority of the Minister of National Defence. Permission is obtained from 1 Canadian Air Division/A3 Special Events in order that foreign military aircraft may perform in an air display or be flown to the site for static display. Foreign military aircraft may not participate in an Air Show without such authority. Proof of authority will be sent for information purposes by 1 Canadian Air Division to Transport Canada General Aviation, Special Flight Operations branch in Ottawa, the local regional office and the military Air Display Director (ADD).

(ii) At all Special Aviation Events where military aircraft participate, a Canadian Forces Air Display Director will be in attendance. This Officer is responsible for the supervision of all military participation whether Canadian or foreign. 1 Canadian Air Division is required under National Defence legislation to approve all military aerobatic flight profiles. Requests for Canadian Forces authority for the operation of foreign military aircraft should contain full particulars as follows:

a. FLY: USAF 1 X F15 DEMO
 1 X F16 DEMO
 USN 1 X E6B FLY-BY

b. STATIC: USN 1 X F14
 USCG 1 X CC130
 RAF 1 X TORNADO

(iii) It is recommended that this information should be sent 7 to 10 working days in advance of the air show date, to:

*1 Canadian Air Division
P.O. Box 17000 Stn Forces
Winnipeg, Manitoba, R3J 3Y5
Attention: A3 Special Events*

Telephone (204) 833-2500 ext 5206

Fax (204) 833-2526

623.07 Minimum Safety Distances and Altitudes

Information Note:

(i) This section provides the minimum safety distances, both horizontal and vertical, which has to be maintained between aircraft in flight and the primary spectator area, secondary spectator areas, built-up areas, and occupied buildings during an air show.

(ii) This section contains the standards for the flying display area, positioning of the show lines required for the aircraft to perform and the standards that are to be met for aircraft operations at air shows in Canada. Outlined are the show line/spectator separation distances that will be specified on all Special Flight Operations Certificates issued to conduct an air show.

Pursuant to section 603.07 of the CARs, the following specifies the minimum distances and altitudes to be maintained at an air show site between a primary spectator area, a secondary spectator area, a built-up area or an occupied building and any aircraft operated in the air show.

(1) Flying Display Area

A flying display area is established at an air show site in accordance with the following requirements, to ensure compliance with the minimum distances and altitudes specified in this section:

- (a) the certificate holder has control of the property that underlies the airspace of the flying display area;*
- (b) the property underlying the flying display area is kept clear of all persons other than essential personnel;*
- (c) buildings inside a flying display area that are normally occupied by non-essential personnel are kept vacant during the execution of a flight program; and*
- (d) access roads that lead to property underlying the flying display area are blocked by crowd control personnel.*

Information Note:

- (i) Refer to Diagram 1 as well as the definition of “flying display area” in section 623.00 of these standards. The flying display area lies within the air show demonstration area, which is the total airspace reserved for the air show and identified as such in the NOTAM issued for the air show, as illustrated in Diagram 1.
- (ii) The size of the flying display area required for the air show will vary according to the type of aircraft participating in the air show. As an example, Category III aircraft such as a Pitts require a flying display area 1000 feet wide and, depending upon the length of the crowd and the manoeuvres being performed, 3000 feet long. Category I aircraft such as a F18 performing air show aerobatic manoeuvres, require a standard flying display area a minimum of 3,000 feet wide (there is provision in these standards for this distance to be reduced under specified conditions) and a minimum of 7,000 feet long.
- (iii) The inability to keep the flying display area clear of people may limit the types of aircraft and manoeuvres that aircraft may perform at an air show site. It is imperative in the initial planning stages that a certificate holder considers aircraft speed and manoeuvres to ensure that the proposed show lines are located at the distances specified in these standards.

(2) Show Lines

One or more show lines, depending on the participating aircraft’s type, category or intended demonstration, is established at an air show site, in accordance with the following requirements, to ensure compliance with the minimum distances and altitudes specified in this section:

- (a) a show line is established at a distance not less than the one specified in Table 1 below, “Minimum Show Line distance from Spectator Areas, Built-up Areas and Occupied Buildings”, in relation to the aircraft’s type or category and intended aerobatic or flight demonstration, from any primary spectator area, secondary spectator areas, built-up areas and occupied buildings, and used as a visual reference by the participating pilots or, in the case of a formation flight, by the formation leader;
- (b) each show line is clearly marked, with appropriate vertical development for the location, to ensure that pilots can maintain visual reference with the show line throughout their performance;
- (c) each show line is appropriately placed and made clearly visible to pilots performing manoeuvres toward the primary spectator area;
- (d) each show line used during an air show held at night is lighted so as to be clearly visible and identifiable from the air by the participating pilots; and
- (e) the location of all show lines and the method by which each line will be marked is clearly indicated on the site diagram submitted in support of the application required under subsection 623.02(1).

Information Note:

An ideal show line is the centre line or edge of an aerodrome runway and should be used even if it means moving the show line out a short distance further than that specified in section 623.07. However, for sites at which there are no appropriately located runways, alternative marking methods are available, provided that they are clearly visible from the air as required in subsection (2) above. Aside from this requirement, Transport Canada does not have specific requirements as to the type of marking to be used.

**TABLE 1 - MINIMUM SHOW LINE DISTANCE
FROM SPECTATOR AREAS, BUILT-UP AREAS
AND OCCUPIED BUILDINGS**

Minimum Show Line Distance from Spectator Areas, Built- up Areas and Occupied Buildings	Aircraft Category or Aircraft Type	Demonstration Manoeuvres Authorized
1,500 feet	Category I Aircraft	Air show aerobatic manoeuvres
1,000 feet	Category II Aircraft	Air show aerobatic manoeuvres
1,000 feet	Helicopters	Air show aerobatic manoeuvres
500 feet	Category III Aircraft	Air show aerobatic manoeuvres
500 feet	Gliders and Hang Gliders	Air show aerobatic manoeuvres
500 feet	Ultra-light aeroplanes and trikes	Air show aerobatic manoeuvres
500 feet	Any single-engine, normally aspirated or fuel-injected, reciprocating-engine airplane with a maximum permissible take-off weight of no more than 2,250 lbs.	Air show aerobatic manoeuvres
500 feet	Helicopters	Agility manoeuvres
500 feet	Category III Aircraft	Non-aerobatic flybys or fly-pasts
500 feet	Category II Aircraft	Non-aerobatic flybys or fly-pasts
500 feet	BD-5J Microjet	Air show aerobatic manoeuvres
100 feet	Powered Parachute Aircraft	Agility manoeuvres

Information Note:

(i) See section 623.00 for a definition of Category I, II and III aircraft.

(ii) The minimum distances in this table are based upon the following criteria:

(a) for reciprocating-engine powered aeroplanes - true airspeed in straight and level flight at 75 percent power at standard temperature and pressure (15°C/sea level), and maximum permissible take-off weight.

(b) for turbine engine powered aeroplanes (does not include the BD-5J Microjet), - 85 percent of the maximum continuous powered, straight and level flight, true airspeed at standard temperature and pressure (15°C/sea level), and maximum permissible take-off weight.

(3) Take-off and Landing Distances from Spectator Areas - No Aerobatic Manoeuvres Conducted

(a) Subject to paragraph (b), the minimum horizontal distance to be maintained from any spectator area, built-up area or occupied building by an aircraft taking off or landing without conducting any air show aerobatic manoeuvre, is not less than the one specified in Table 2 below “Minimum Distance between Spectator Areas, Built-up areas or Occupied Buildings and Take-off/landing Surface” in relation to that aircraft’s performance characteristics.

(b) Helicopters may, following the completion of a landing or coming to a stable hover, no closer than 500 feet from spectators, hover taxi to a clearly marked landing area, no closer than 200 feet from a spectator enclosure.

Information Note:

Refer to Diagram 5 for an illustration of the above requirements.

(c) The minimum distances specified in Table 2 below

- (i) for single aircraft operations conducted on the centerline, is measured to the runway centerline, and
- (ii) for formation take-off or landing operations, is measured to the runway edge.

**TABLE 2 -
MINIMUM DISTANCE BETWEEN SPECTATOR AREAS,
BUILT-UP AREAS OR OCCUPIED BUILDINGS AND
TAKE-OFF/LANDING SURFACE**

Minimum Distance between Spectator Areas, Built-up areas or Occupied Buildings and Take-off/Landing Surface	Aircraft Performance Characteristics
100 feet	Powered Parachute Aircraft
200 feet	(1) Aeroplanes with V_{ref} of 60kts or less and a certificated gross weight of 2500 lbs or less, including ultra light aeroplanes and trikes
200 feet	(2) Gliders and hang gliders (See Diagram 2)
200 feet	(3) Helicopters - engine start and shutdown and hover taxi in ground effect (see Diagram 5)
300 feet	Aeroplanes with V_{ref} of 100kts or less and certificated gross weight of 50,000 lbs or less
500 feet	(1) Aeroplanes with V_{ref} in excess of 100kts
500 feet	(2) Aeroplanes with a certificated gross weight in excess of 50,000 lbs
500 feet	(3) Aeroplanes conducting excessive, non-aerobatic manoeuvring on take-off or landing (comedy acts) (see Diagram 4)
500 feet	(4) Helicopter - take-off and landing (see Diagram 5)
Information Notes: (a) The minimum 200 foot distance for gliders includes gliders being towed for launch by either aeroplanes or automobiles. (b) V_{ref} is $1.3 \times V_{so}$	

(4) Take-off and Landing Distances from Spectator Areas - Air Show Aerobatic Manoeuvres Conducted

Where a take-off runway or area is separated from a primary spectator area or secondary spectator area by less than 500 feet for a Category III aircraft, by less than 1,000 feet for Category II aircraft and by less than 1,500 feet for Category I aircraft:

- (a) an air show aerobatic manoeuvre may only be performed if
 - (i) the aircraft has passed the end of the spectator area, and
 - (ii) there is no built-up area or spectator underneath the aircraft; or

Information Note:

Refer to Diagram 6 for an illustration of the requirements applicable to Category III aircraft.

- (b) an air show aerobatic manoeuvre may be performed after take-off, once the aircraft has turned away from any spectator area and crossed the show line appropriate to that aircraft.

Information Note:

For an illustration of the requirements applicable to Category III aircraft, refer to Diagram 7.

(5) Manoeuvres Along Show Lines

When conducting a display manoeuvre, an aircraft is flown in the flying display area and along the appropriate show line, at a distance from any primary spectator area, secondary spectator area, built-up area and occupied building established as follows:

(a) Category I Aircraft

- (i) subject to subparagraph (ii) or (iii) below, the distance from the show line to any primary spectator area, secondary spectator area, built-up area and occupied building for a Category I aircraft is 1,500 feet or more, for a minimum total distance of 3,000 feet from the primary spectator area, secondary spectator area, built-up area or occupied building,

Information Note:

For an illustration of the above requirements, refer to Diagram 8.

- (ii) where a prominent terrain feature exists that may be utilized to mark the show line, the distance between the show line and the primary spectator area may, upon application made under section 623.02, be reduced from 1500 feet to 1200 feet,

Information Note:

For an illustration of the above requirements, refer to Diagram 9.

- (iii) the distance between the show line and any secondary spectator area, built-up area or occupied building on the reverse side of the show line may, upon application made under section 623.02, be reduced from 1500 feet to 1200 feet, and

Information Note:

For an illustration of the above requirements, refer to Diagram 10. This reduction may be authorized in the special flight operations certificate issued for the air show, if it eliminates the need to move the show line off a prominent terrain feature in order to keep non-essential personnel clear of the flying display area.

- (iv) a Category I aircraft may use the 500 foot show line in accordance with subsections (10) and (11) when performing a flyby or fly-past;

Information Note:

- (i) For an illustration of the above requirements, refer to Diagrams 11 and 12(a).
- (ii) The reduction of the distances outlined in subparagraph (ii) and (iii) above is normally only authorized when flight safety can be enhanced by providing pilots with improved visibility of the show line.

The approved distance reduction applies to one side of the show line only. The optimum distance between the primary spectator area and either of the secondary spectator area, built-up area or occupied buildings, on the reverse side of the show line is 3,000 feet. When a reduction referred to in subparagraph (ii) or (iii) above is authorized, the distance can be reduced to no less than 2,700 feet.

- (iii) A request to authorize a reduction for the purpose of allowing an enlargement of a spectator area will not be considered. A reduction of the distances will not be authorized where the primary spectator area may be moved at least 1,500 feet from a prominent feature that could be used as a show line.

(b) Category II Aircraft

- (i) subject to subparagraph (ii) or (iii) below, the distance from the show line to any primary spectator area, secondary spectator area, built-up area or occupied building for a Category II aircraft has to be 1,000 feet or more, for a minimum total distance of 2,000 feet from the primary spectator area, secondary spectator area, built-up area or occupied building,

Information Note:

For an illustration of the above requirements, refer to Diagram 13.

- (ii) where a prominent terrain feature exists that may be utilized to mark the show line, the distance between the show line and the primary spectator area may, upon application made under section 623.02, be reduced from 1,000 feet to 800 feet,

Information Note:

For an illustration of the above requirements, refer to Diagram 13(a).

- (iii) the distance between the show line and any secondary spectator area, built-up area or occupied building on the reverse side of the show line may, upon application made under section 623.02, be reduced from 1,000 feet to 800 feet, provided this reduction eliminates the requirement to move the show line off a prominent terrain feature in order to keep non-essential personnel clear of the flying display area, and

Information Note:

For an illustration of the above requirements, refer to Diagram 14.

- (iv) a Category II aircraft may use the 500 foot show line in accordance with subsections 10 and 11, when performing a flyby or fly-past; and

Information Note:

- (i) For an illustration of the above requirements, refer to Diagrams 12 and 12(a).
(ii) The reduction of the distances outlined in subparagraph (ii) and (iii) above is normally authorized only when flight safety can be enhanced by providing pilots with improved visibility of the show line.

The approved distance reduction applies to one side of the show line only. The optimum distance from the primary spectator area and either of the secondary spectator area, built-up area, or occupied building on the reverse side of the show line is 2,000 feet minimum. When a reduction referred to in subparagraph (ii) or (iii) above is authorized, the distance can be reduced to no less than 1,800 feet.

- (iii) A request to authorize a reduction for the purpose of allowing an enlargement of a spectator area will not be considered. A reduction of the distances will not be authorized where the primary spectator area may be moved at least 1,000 feet from a prominent feature that could be used as a show line.

(c) Category III Aircraft

The distance from the show line to any primary spectator area, secondary spectator area, built-up area or occupied building for a Category III aircraft has to be 500 feet or more, for a total minimum distance of 1,000 feet from the primary spectator area, secondary spectator area, built-up area or occupied building.

Information Note:

- (i) For an illustration of the above requirements, refer to Diagrams 12 and 12(a).
(ii) Compliance with paragraph (c) may result in the show line being positioned more than 500 feet from the primary or secondary spectator areas, built-up areas, and occupied buildings. (Refer to Diagram 11).

(6) Helicopter Demonstrations

A helicopter authorized in the special flight operations certificate issued for the air show to perform at an air show for the purposes of aerial demonstrations may perform the following:

- (a) agility manoeuvres along a show line at a distance of no less than 500 feet from any spectator area; and

Information Note:

Agility manoeuvres include abrupt pedal turns, sideward and rearward flight manoeuvres, out-of-ground effect hovering, and continued operation in the avoid area of the height velocity diagram.

(b) air show aerobatic manoeuvres, at a distance no less than 1,000 feet from any spectator area, including 90 degree pitch downs, split “S”s, loops and barrel rolls.

(7) Non-Demonstration Helicopter Operations at Air Show Sites

A non-demonstration helicopter operation at an air show site for which a special flight operations certificate special aviation event has been issued, is conducted in accordance with the distance and altitude requirements of this section.

Information Note:

As defined in section 623.00, a non-demonstration helicopter operation at an air show is any helicopter operation taking place in the vicinity of a primary or secondary spectator area, at a site for which a special flight operations certificate for the air show has been issued. Such non-demonstration operations are not required to be authorized in the special flight operations certificate issued for the air show and generally include sight-seeing operations, arrivals and departures of transient helicopters, and helicopter movements for air show medevac duties or crash recovery.

(8) Repositioning Turns

A repositioning turn required for an aircraft to realign with a show line or return to the flying display area may be made as follows:

(a) at a maximum 90 degree bank angle and a maximum 60 degree pitch angle, provided that the pilot of the aircraft holds:

- (i) a Transport Canada “Statement of Aerobatic Competency” (form 26-0307),
- (ii) an FAA “Statement of Acrobatic Competency” (form 8710-7), or
- (iii) an aerobatic competency certificate equivalent to (i) and (ii) above, and recognized by Transport Canada; or

(b) at a maximum 75 degree bank angle and at a maximum 60 degree pitch angle where the pilot does not hold any of the qualifications referred to in paragraph (a).

(9) Minimum Altitudes

(a) The minimum altitudes at which an aircraft participating in an air show may perform, unless otherwise authorized in the special flight operations certificate issued for the air show, are as follows:

- (i) 300 feet above ground level, where the aircraft is flown at an indicated airspeed of 156 knots or less, or
- (ii) 500 feet above ground level, where the aircraft is flown at an indicated airspeed exceeding 156 knots.

Information Note:

(i) *The authorizations may be granted in the special flight operations certificate issued for the air show to individual performers or groups of performers and may be granted for complete routines or individual manoeuvres.*

(ii) *Possession of a Transport Canada or FAA Statement of Aerobatic Competency, does not, by itself, provide the necessary authority for low altitude flight at a special aviation event - air show. Each performer, the manoeuvres to be performed and the minimum altitude need to be identified in the special flight operations certificate issued for the air show.*

(b) To have aerobatic performers authorized in the special flight operations certificate issued for the air show to carry out low level performances,

(i) the application made under section 623.02 outlines the minimum altitude requested and the type of performance to be carried out by the participant or participants, on a Transport Canada form 26-0374 (Flight Program)(refer to Appendix B) or in letter form containing the information found on form 26-0374, and

(ii) the certificate holder ensures, prior to making the application, that each participant meets all applicable requirements and that the related documents specified in section 623.06 have been submitted.

(c) Other flying performances other than those referenced in (b) above, such as water bombing or similar demonstrations by aeroplanes, helicopter demonstrations, flybys or fly-pasts may be conducted at lower altitudes where so authorized in the special flight operations certificate issued for the air show, upon application made under section 623.02.

Information Note:

A certificate holder should review proposed low altitude performances and demonstrations to determine if they are appropriate to the air show site. Factors such as spectator visibility, adverse terrain, etc. have to be considered in this decision. It is then a certificate holder's responsibility to request low level authorization. Low level performances are to be listed in the special flight operations certificate issued for an air show in order to be flown in the air show.

(10) Flybys

A flyby may be conducted:

(a) along a clearly marked show line, at a minimum distance of not less than 500 feet from any primary spectator area, secondary spectator area, built-up area or occupied building;

(b) in the case of a single aircraft, at an altitude no lower than 200 feet AGL, provided the requirements of section 602.32 of the CARs are complied with and that the following parameters are not exceeded, regardless of the category of aircraft:

(i) bank angle: 75 degrees,

- (ii) pitch angle: 45 degrees, and
 - (iii) indicated airspeed: 250 knots; and
- (c) in the case of a formation or a trail flyby, at an altitude no lower than 200 feet AGL, provided the requirements of subsection 602.32(3) of the CARs are complied with and the following parameters are not exceeded, regardless of the category of aircraft:
- (i) bank angle: 45 degrees,
 - (ii) pitch angle: 45 degrees, and
 - (iii) indicated airspeed: 250 knots.

Information Note:

As defined in 623.00 (Interpretation), a flyby means a non-aerobatic pass or a series of non-aerobatic passes, performed by one or more aircraft at an air show. A flyby can be performed by a single aircraft, by aircraft in formation, or by aircraft in trail.

(11) Fly-pasts

(a) Non-Formation Fly-pasts

A non-formation fly-past may be conducted by:

- (i) a Category II aircraft along the 500 foot show line, at an altitude no lower than 200 feet AGL, provided a maximum angle of 75 degrees of bank and 60 degrees of pitch is not exceeded, or
- (ii) a Category I aircraft along the 500 foot show line, at an altitude no lower than 200 feet AGL, provided a maximum angle of 60 degrees of bank and 60 degrees of pitch is not exceeded.

(b) Formation Fly-pasts

A formation fly-past may be conducted along a minimum 500 foot show line distance measured from the aircraft that is closest to any primary spectator or secondary spectator area, at the following altitudes:

- (i) for Category II aircraft, at an altitude no lower than 100 feet AGL, provided the aircraft are flown straight and level along the 500 foot show line, or
- (ii) for Category I aircraft, at an altitude no lower than 200 feet AGL, provided the aircraft are flown straight and level along the 500 foot show line.

Information Note:

As defined in 623.00 (Interpretation), a fly-past is a non-aerobatic pass, performed by one or more aircraft as an integral part of an aerobatic routine, at an air show. A fly-past can be performed by a single aircraft, by aircraft in formation, or by aircraft in trail.

(12) Flight Over Built-up Areas Adjacent to Flying Display Areas

An aircraft participating in an air show may be flown over a built-up area adjacent to the intended flying display area provided:

- (a) no air show aerobatic manoeuvre is performed over the built-up area;
- (b) Minimum Altitude - an altitude of at least 1000 feet above the highest obstacle is maintained within a radius of 2,000 feet from the aircraft while over the built-up area;
- (c) Entering Flying Display Area from Built-up Area - where the aircraft is entering the flying display area from flying over the built-up area, a smooth transition is conducted from the altitude referred to in paragraph (b) above to the aircraft's performance altitude along the show line. The transition may be conducted at a steep angle of descent, but in no case less than that of the normal approach for the aircraft type; and

Information Note:

Refer to Diagram 16 for an illustration of the above requirement.

- (d) Exiting Flying Display Area toward Built-up area - where the aircraft is exiting the show line on a flight path directed toward a built-up area, the aircraft is flown at a climb rate consistent with its safe operation or at the recommended best pitch attitude for the aircraft type. If extended flight over the built-up area is expected, the aircraft is flown at the minimum altitude specified in paragraph (b).

Information Note:

Refer to Diagram 16 for an illustration of the above requirement.

(13) Night Special Aviation Events - Air Shows

An aircraft participating, in an air show, at night has to be operated as follows:

- (a) any aerobatic demonstration has to be performed within an area confined to one nautical mile (NM) on either side of the show centre, along a lighted show line that is clearly visible and identifiable by pilots from the air;
- (b) any aerobatic demonstration has to be performed between an altitude no lower than 500 feet AGL and no higher than 5,000 feet AGL;
- (c) an aerobatic demonstration may only be carried in weather conditions where the ceiling is 2,500 feet or more AGL and ground visibility of three miles or more; and
- (d) the aircraft's position lights are operating except while pyrotechnics on the aircraft are illuminated.

(14) Air Show Manoeuvres Toward the Primary Spectator Area**(a) Flight Manoeuvres that will NOT be approved for inclusion in an Air Show**

Air show aerobatic manoeuvres conducted inside the aerobatic box that have a descending

recovery with a pull or push and having a flight path which, when extended, would contact the primary spectator area will not be approved for inclusion in an air show.

(b) Flight Manoeuvres requiring no special assessment

The following manoeuvres or flights can be approved, for inclusion in an air show provided that any condition specified in respect of that manoeuvre or flight in subparagraphs (i) through (vi) below is met:

- (i) an air show aerobatic manoeuvre in which the aircraft, but not the actual energy vector, is momentarily pointed towards the primary spectator area, such as a hammerhead turn, a spin, an inverted flat spin, a tail slide, torque roll and lomcevak,
- (ii) a 360 degree non-aerobatic turn, by a single aircraft, along the show line appropriate to the aircraft category, provided the turn is performed in accordance with the following:
 - (A) for a Category III aircraft, at a maximum altitude of 250 feet AGL,
 - (B) for a Category II aircraft, at a maximum altitude of 300 feet AGL, and
 - (C) for a Category I aircraft, at a maximum altitude of 400 feet AGL,

Information Note:

Refer to Diagram 17 for an illustration of the above requirement.

- (iii) a non-aerobatic manoeuvre by a single aircraft, with an energy vector directed towards the primary spectator area, provided
 - (A) in the case of a powered aircraft flown at an indicated airspeed of 300 knots or less, no part of the manoeuvre is performed at a distance closer than 1500 feet to a primary spectator area,

Information Note:

Refer to Diagram 18 for an illustration of the above requirement.

- (B) in the case of a powered aircraft flown at an indicated airspeed greater than 300 knots, no part of the manoeuvre is performed at a distance closer than 3000 feet to a primary spectator area, or

Information Note:

Refer to Diagram 19 for an illustration of the above requirement.

- (C) in the case of a glider, no part of the manoeuvre is performed at a distance closer than 500 feet to a primary spectator area,
- (iv) flight over the primary spectator area by a single aircraft, an aircraft in a single formation or by multiple aircraft in trail, provided

- (A) the minimum altitude of the flight is no lower than 1000 feet above the primary spectator area,
 - (B) the flight is straight and level or the wings are level in a normal climb,
 - (C) the flight is in one direction only, that is back to front or front to back,
 - (D) if the aircraft is circling jumpers, it does so down to an altitude of no lower than 1000 feet above the primary spectator area and complies with the conditions specified in section 623.37 below, and
 - (E) in airspace where the use of Mode C transponders is required by law, the aircraft's transponder is turned on and serviceable, at all times, during the flight over the primary spectator area,
- (v) flight over the secondary spectator area, provided
- (A) the minimum altitude of the flight is no lower than 500 feet above the spectators, and
 - (B) until the aircraft reaches an altitude of 500 feet AGL, the flight is non-maneuvring and the wings are level in a normal climb, and
- (vi) a repositioning turn provided it is performed in accordance with the requirements of subsection 623.07(8).

(c) Flight Manoeuvres for which Special Assessment IS Required

The following manoeuvres or flights can be approved for inclusion in an air show only with the favourable assessment referred to in paragraph 623.06(1)(e) and, subject to and in accordance, with any conditions specified for those manoeuvres in the letter of assessment:

- (a) an air show aerobatic manoeuvre which directs an energy vector toward the primary spectator area at any point of the manoeuvre, other than a manoeuvre described in paragraph (12)(a), or
- (b) a non-aerobatic manoeuvre by multiple aircraft or aircraft in formation, including one or more 360 degree turns, with an energy vector directed towards the primary spectator area.

623.08 Weather Conditions

Pursuant to section 603.08 of the CARs, the minimum weather conditions under which an aircraft may be operated, at an air show, are as follows:

- (a) subject to paragraph (d), a minimum ceiling of 1,000 feet AGL and a ground visibility of three miles, as specified in the special flight operations certificate issued for the air show;

(b) any flight demonstration, whether aerobatic or not, is conducted clear of cloud and no lower than the minima specified in the special flight operations certificate issued for the air show;

(c) an aerobatic demonstration carried out by an aircraft in weather conditions that are at the minima referred to in paragraph (a) above, is limited to

(i) air show aerobatic manoeuvres conducted by Category III aircraft, within a flying display area having a maximum diameter of 2 statute miles (SM) centred on the air show central control, as indicated on the site diagram submitted with the application; and

(ii) air show aerobatic manoeuvres that have been identified in the application submitted in accordance with section 623.02; and

(d) the Special Flight Operations Certificate issued in respect of the air show may specify a higher ceiling minimum and a higher visibility minimum where justified by the presence of surrounding terrain or other local conditions.

623.09 Participant Briefing

Information Note:

The importance of the participant briefing to the safe and successful conduct of a special aviation event cannot be overemphasized. Although entitled Participant Briefing, it is a safety briefing at which all aspects of the flying, ground, and emergency procedures of the proposed air show should be reviewed. The briefing should be conducted in such a way that every performer and air show personnel in charge of the air, ground and emergency operations, leaves the briefing with a clear understanding of their responsibilities and procedures to be followed in normal or emergency situations that may occur during the course of the air show.

(1) General Requirements

Pursuant to section 603.09 of the CARs, the standards for a participant briefing, held at an air show, are as follows:

(a) a briefing is conducted prior to the commencement of each flight program of an air show;

(b) a briefing is carried out in an area as free of noise and other distractions as possible and attendance has to be limited to flight crews, flight crew support staff, parachutists, ground performers such as pyrotechnic teams, public announcers, key event personnel and other concerned event personnel;

Information Note:

As defined in section 623.00, key event personnel means a person or persons having original or delegated responsibility for the air, ground, safety and emergency operations at an air show.

- (c) each participant's attendance at a briefing is verified by roll call or otherwise, and a record retained for submission to Transport Canada, if requested;
- (d) performers who are not briefed are not permitted to participate in the flight program covered in the briefing;
- (e) for team performances, only the team leader is required however; the team leader may be represented by a delegate, provided the person is a flight member of the team;
- (f) for an aircraft that is to be launched from a remote airfield, the briefing may be given to the aircraft's pilot by telephone; and
- (g) the briefing is conducted at a time as close to the performance time as practicable.

(2) Briefing Contents

The briefing includes the following:

- (a) the key air show personnel is introduced and the means of communication with them is described;
- (b) a weather briefing covering aspects of the weather that are significant to the conduct of the air show is given such as altimeter setting, cloud cover or ceiling, visibility, winds and temperature, density altitude and other weather data forecast for the period of the air show, including, where a low ceiling program has been approved in the Special Flight Operations Certificate issued in respect of the air show, the revised low show program;
- (c) the airport air traffic zone details such as position, dimensions, height above MSL, including the airspace reserved in the NOTAM issued for the air show, including local obstructions, warnings and other pertinent information such as bird activity and other nearby aerial activity;
- (d) the method of coordinating air traffic, including the type of coordination, namely control or advisory by FSS, or other type of air traffic coordination. This aspect of the briefing has to include air show frequencies and assignment of radio call signs, if necessary;
- (e) the methods of suspending a performance or the flight program, or recalling a performer by both radio and visual signals;
- (f) the layout of the air show site, including the position of spectator areas, civilian and military show lines, direction of entry and exit lanes, holding areas and alternate aerodromes is described with the use of aerial photographs, maps, scale diagrams or other means of depiction;
- (g) the proposed flight program schedule, including start-up, taxi, take-off, show routine and landing timings, the "on" and "off" stage times and the location of the previous and next performer;

- (h) other programmed flying events before, during or after the flying display portion itself such as balloon operations, parachuting, flybys and similar aerial displays;
- (i) wake turbulence and associated dangers;

Information Note:

The wake turbulence factor should be considered in preparing the flight program.

- (j) the firefighting and emergency services equipment available, including their location and the access routes to be kept clear;
- (k) a “time check or “time hack” is carried out to ensure all participants are using the same time for air show coordination;
- (l) the flight operations director or other person responsible for flight operations ensures each performer understands the applicable written limits with respect to individual low level authorizations contained in the special flight operations certificate issued for the air show; and
- (m) any other subject or action relevant to the specific flight program.

Information Note:

- (i) *Items in section (l) above need not be discussed during the participant briefing, if personally covered by the person assigned by the certificate holder to brief the participants and the performer earlier at the site.*
- (ii) *Examples of other subjects that have been included in briefings are medical factors affecting pilot performance, e.g. over the counter medication, pilot fatigue, heat stress and factors affecting orientation of flight over water demonstrations or unusual terrain.*
- (iii) *It is suggested that, at the briefing on the final day of an air show, a “Departure Briefing” be included to advise participants of Air Traffic Control procedures, etc. to be followed on leaving the air show site. Pilots should be reminded that their departures are to be normal and that no “ad hoc” demonstrations are to take place during their departures.*

(3) Participant’s Statement

Personnel designated by the certificate holder ensures that

- (a) each participant is given the opportunity to read the special flight operations certificate issued for the air show;
- (b) each civilian participant has signed the participant’s statement attached as “Appendix A” to these standards;
- (c) any performer who has not complied with paragraph (b) above is not allowed to participate in the air display;

(d) for a performer who received a telephone briefing, he or she signs the participant's statement on behalf of the performer and so indicates on the form; and

(e) at the end of the briefing, a copy of each participant's statement is given to the monitoring Civil Aviation Inspector or, if an inspector is not on site, that the copy is forwarded to the appropriate Transport Canada Regional General Aviation office, no later than on the first business day following the air show.

623.10 to 623.36 Reserved

623.37 Parachuting

Information Note:

(i) Parachuting, when properly organized and conducted by qualified and experienced parachutists, can be an asset to an air show or other aviation event.

(ii) Parachute descents, other than emergency descents, have to be authorized in accordance with the provisions of section 603.37 of the CARs. Where parachuting, by other than military personnel, is to be conducted at a special aviation event, application may be made in accordance with the special flight operations standards - parachute descents, by the certificate holder on behalf of the parachutists.

Pursuant to section 603.38 of the CARs, a parachute descent, at a Canadian special aviation event is made in accordance with a special flight operations certificate - parachuting, issued under section 603.38 of the CARs; and

(a) parachutists may exit the jump aircraft over any primary spectator area, secondary spectator area, built-up area or occupied building, provided the exit is made in conditions such that, in the event of a parachute malfunction, the parachutist or associated equipment will not land within any of these areas;

(b) once under a fully functioning parachute canopy, the parachutist may glide and descend to an altitude no lower than 100 feet above a primary spectator area or secondary spectator area;

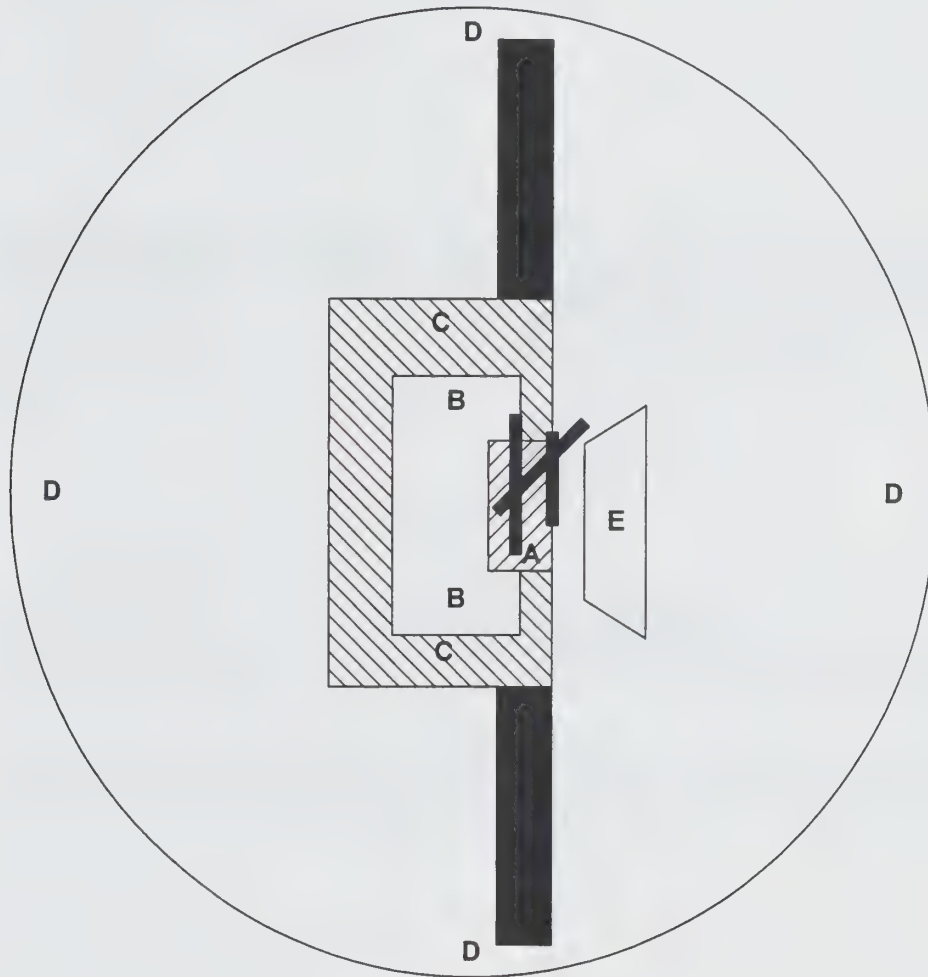
Information Note:

The above minimum altitude requirement means 100 feet from the lowest part of any equipment the parachutist is carrying (i.e. flag or smoke canisters).

(c) an aircraft may circle the jumpers as part of the demonstration, subject to the following conditions:

(i) the pilots of the jump aircraft and circling aircraft have determined the procedures to be followed by each pilot in order to ensure that adequate separation is maintained between the aircraft and the parachutists,

- (ii) all pilots and parachutists participating in the demonstration have been briefed and understand the procedures to be followed,
- (iii) the pilot of the circling aircraft does not begin circling the parachutists until
 - (A) he or she has been notified that all jumpers have exited the jump aircraft, and
 - (B) all canopies are open and clearly visible to the pilot, and
- (d) a two-way radio communication is maintained between the aircraft involved in the demonstration, air traffic control personnel and the landing zone supervisor or the flight operations director or other person responsible for flight operations until the demonstration is completed.

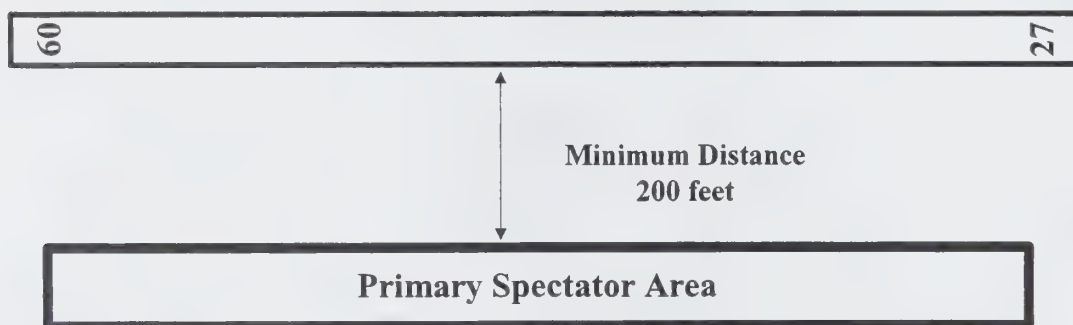
*Diagrams***Diagram 1**

In the above diagram:

- (a) Box A is depicting an aerobatic box for Cat III aircraft;
- (b) Box B is depicting an aerobatic box for Cat I aircraft;
- (c) Box C is depicting the flying display area for the air show site;
- (d) Area D is depicting the air show demonstration area;
- (e) Box E is depicting the Primary Spectator Area; and
- (f) Boxes F are depicting ingress and egress routes into and out of the flying display area.

Diagram 2

Minimum Separation Distance Between Runway or Take Off Area and the Primary Spectator Area for Aeroplanes with Vref of 60kts or less and a certificated gross weight of 2500 lbs or less, ultra light aeroplanes and trikes, gliders and hang gliders

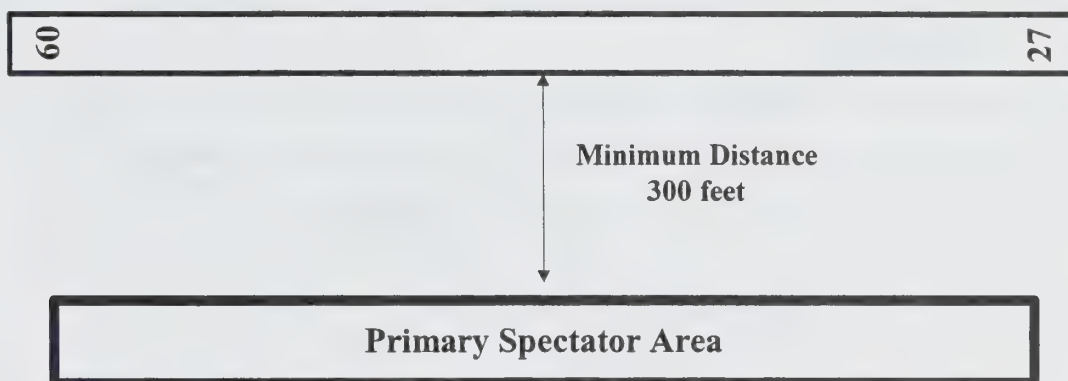


As per par. 623.07(3)(c), the minimum distances illustrated in this diagram for:

- a) single aircraft operations conducted on the centerline are to be measured to the runway centerline; and
- b) formation takeoff/landing operations, are to be measured to the runway edge.

Diagram 3

Minimum Separation Distance Between Runway or Take Off Area and the Primary Spectator Area for Aircraft with Vref of 100kts or less and certificated gross weight of 50,000 lbs or less

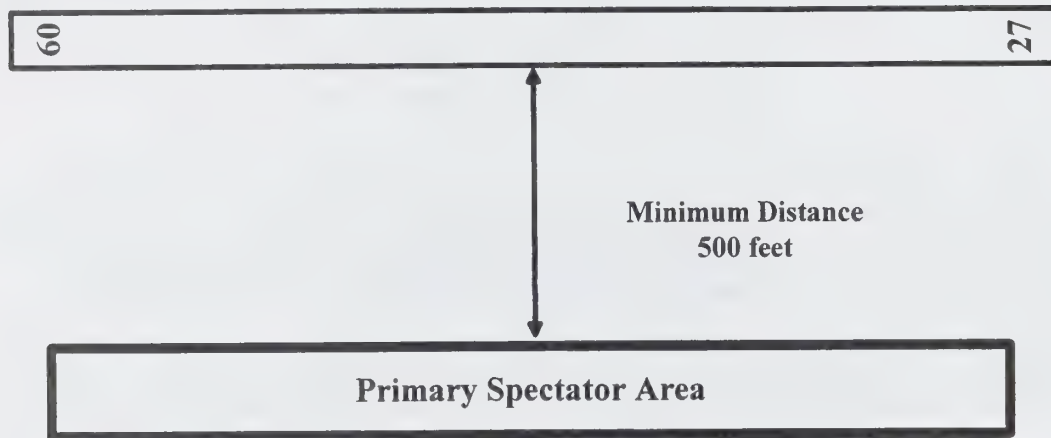


As per par. 623.07(3)(c), the minimum distances in this diagram for:

- a) single aircraft operations conducted on the centerline are to be measured to the runway centerline; and
- b) formation takeoff/landing operations, are to be measured to the runway edge.

Diagram 4

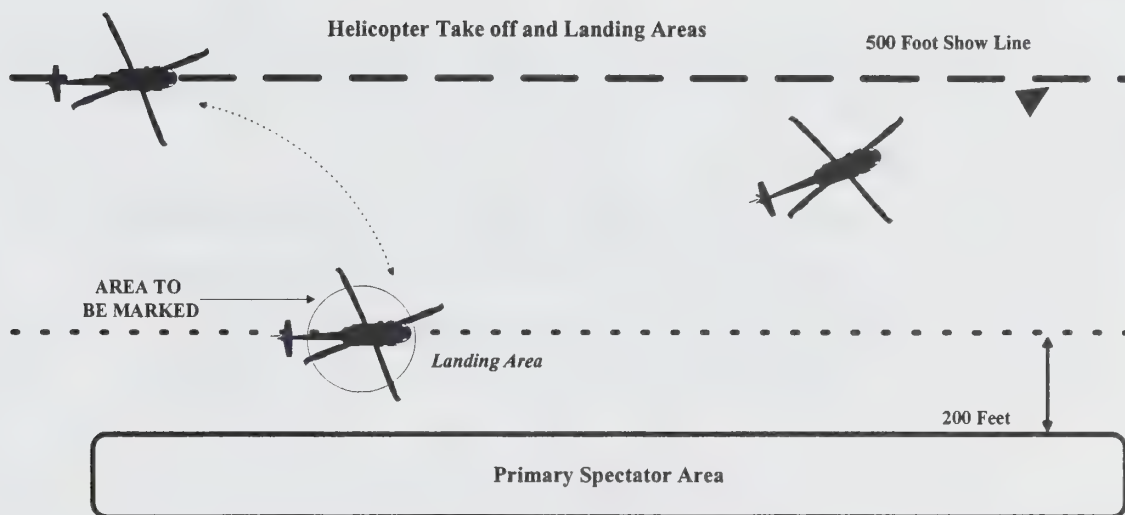
Minimum Separation Distance Between Runway or Take Off Area and the Primary Spectator Area for Aeroplanes with V_{ref} in excess of 100kts, Aeroplanes with a certificated gross weight in excess of 50,000 lbs and Aeroplanes conducting excessive, non-aerobatic manoeuvring on takeoff or landing (comedy acts)



As per par. 623.07(3)(c), the minimum distances in this diagram for:

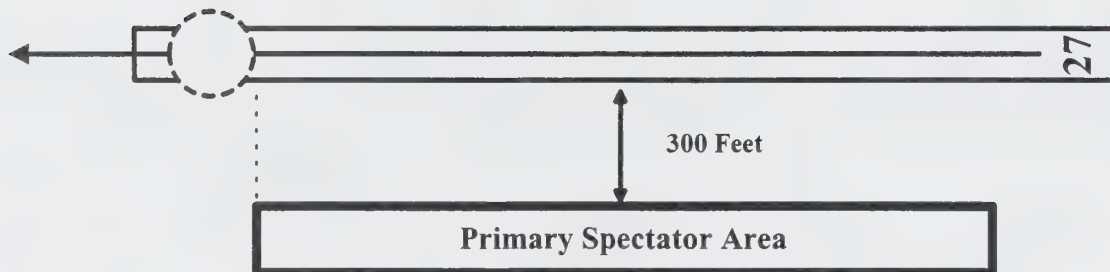
- a) single aircraft operations conducted on the centerline are to be measured to the runway centerline; and
- b) formation takeoff/landing operations, are to be measured to the runway edge.

Diagram 5



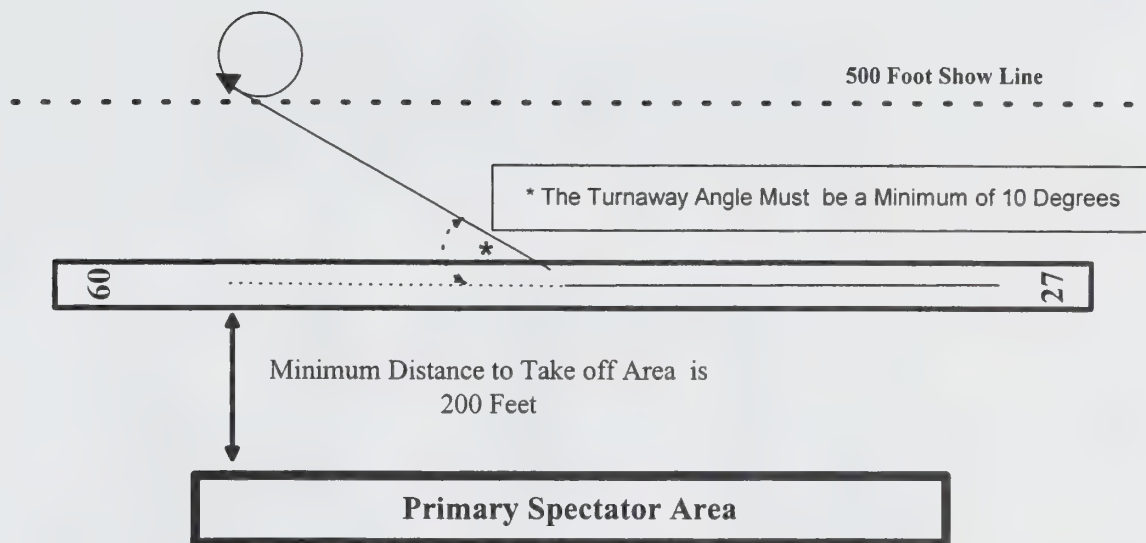
- (a) As per par. 623.07(3)(b), helicopters are allowed, following the completion of a landing or coming to a stable hover, at a distance no less than 500 feet from spectators, to hover taxi to a clearly marked landing area, at a distance no less than 200 feet from a spectator enclosure.
- (b) As per section 623.00, hover taxi means helicopter movement conducted above the surface and in ground effect, at airspeeds less than 20 knots.

Diagram 6



Note: In the above diagram, the runway or take-off area for the Cat III Aircraft is less than 500 feet from the primary spectator area. Thus, as per par. 623.07(4)(a), aerobatic manoeuvres are not allowed after take-off until the aircraft is beyond the end of the spectator area.

Diagram 7



Note: In the above diagram, the runway/take-off area for the CAT III aircraft is less than 500 feet from the primary spectator area. Thus, as per par. 623.07(4)(b) aerobatic manoeuvres are allowed after take-off when a "turn away" is carried out as illustrated above and once the aircraft has reached the 500 foot show line.

Diagram 8

Optimum Position of Show Lines For
Category I Aircraft

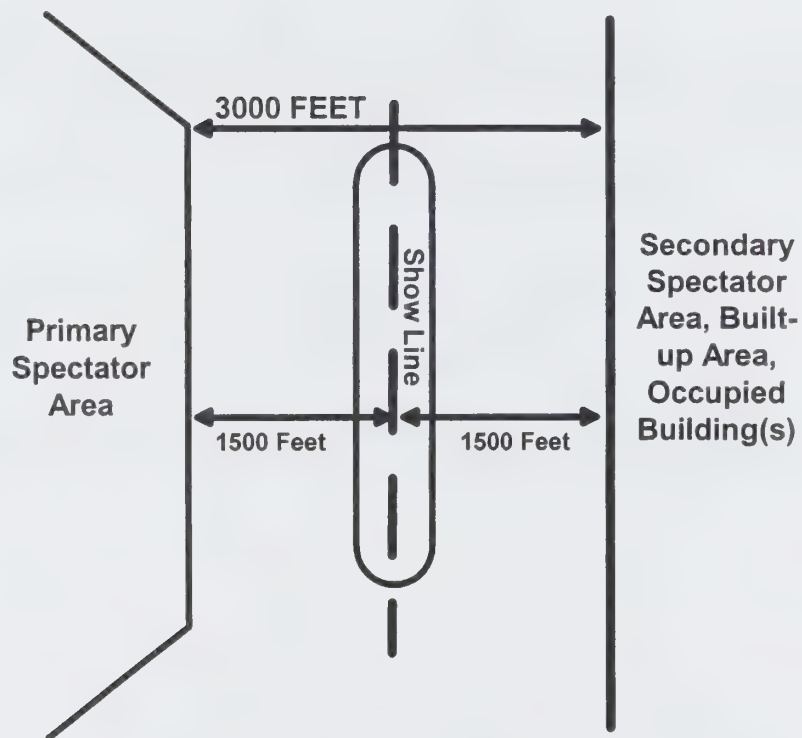


Diagram 9

Position of Show Line for Category I Aircraft
When Reduced Distance Between the Primary
Spectator Area and the Show Line is Approved

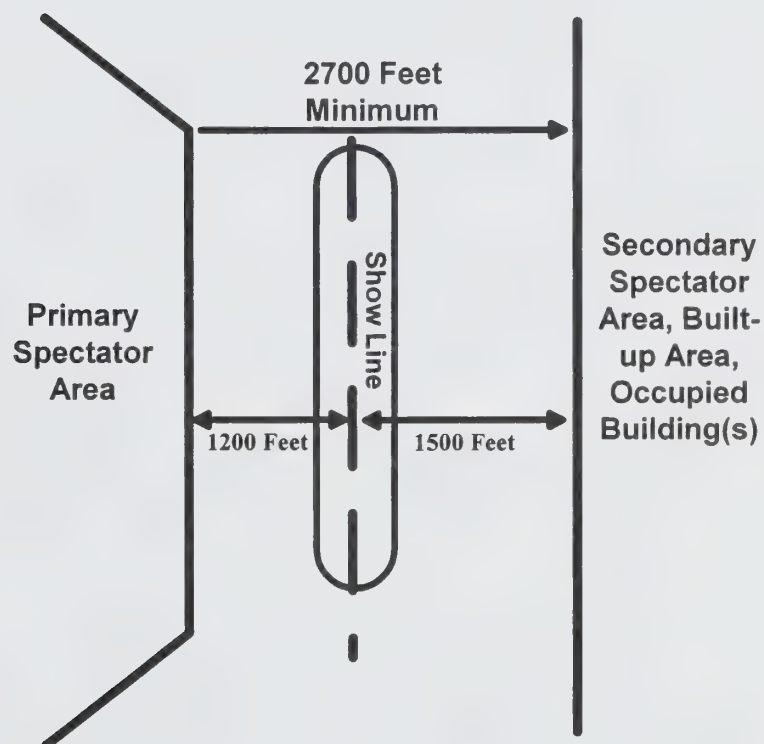


Diagram 10

Position of the Show Line for Category I
Aircraft When the Reduced Distance Between
the Secondary Spectator Area, Built-up Area,
Occupied Building(s) has been Approved

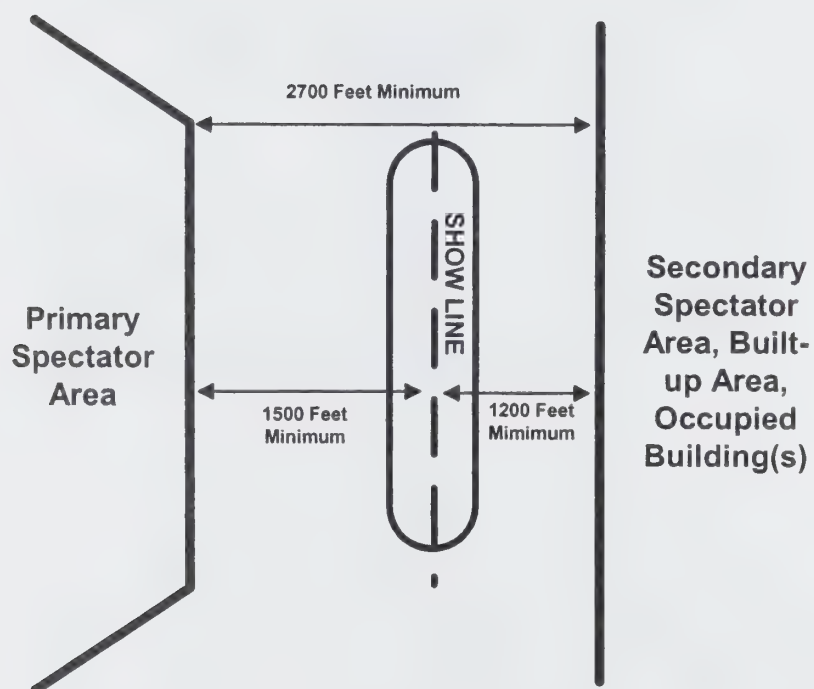
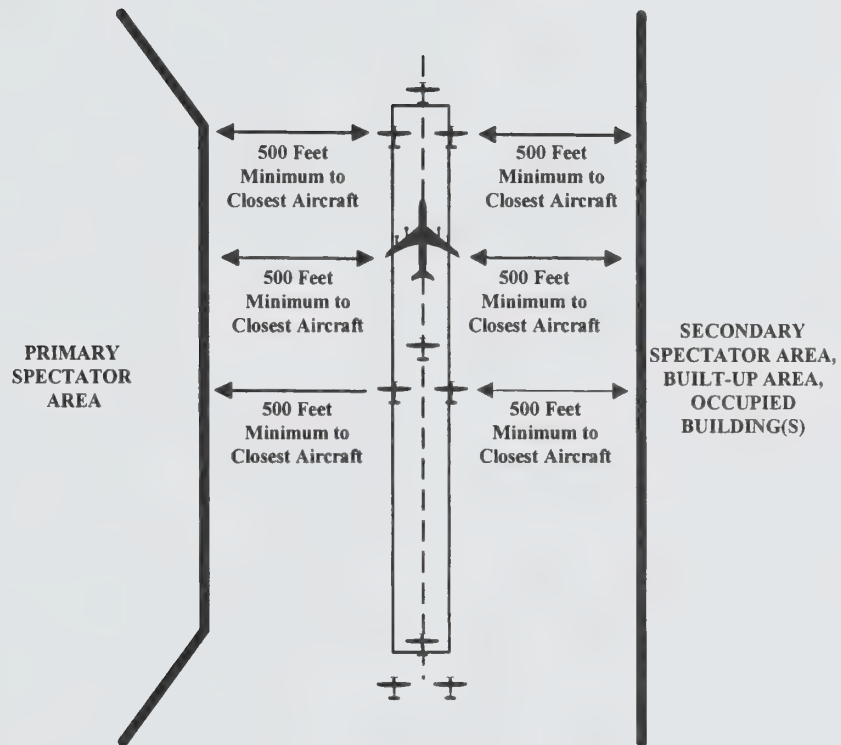


Diagram 11



NOTE: As per ss. 623.07(2), this diagram illustrates how the minimum distance between the primary spectator area and the secondary spectator area, etc. must be more than 1000' in order to maintain the minimum 500' distance on each side of the show line.

Diagram 12

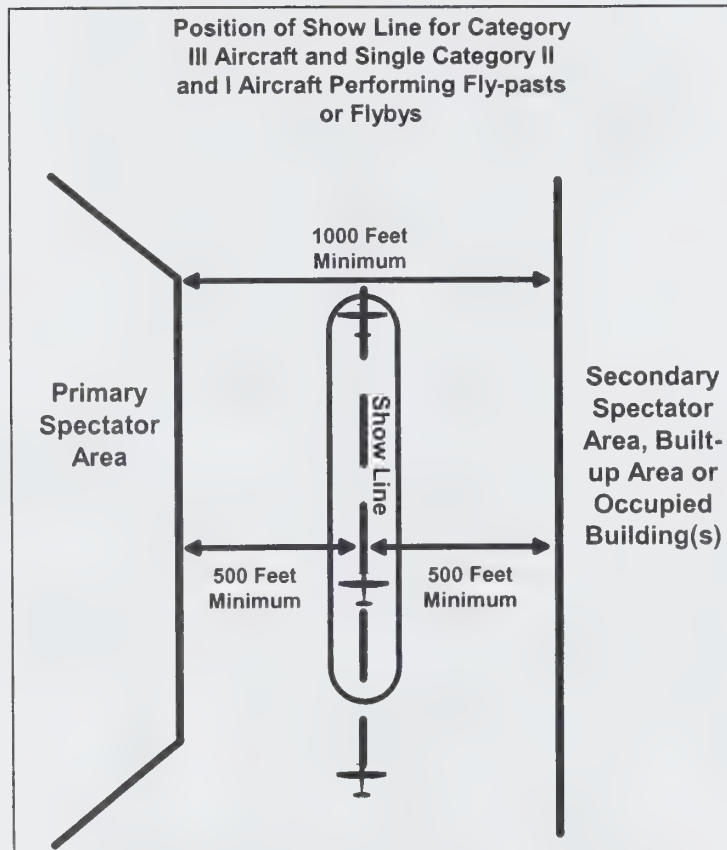
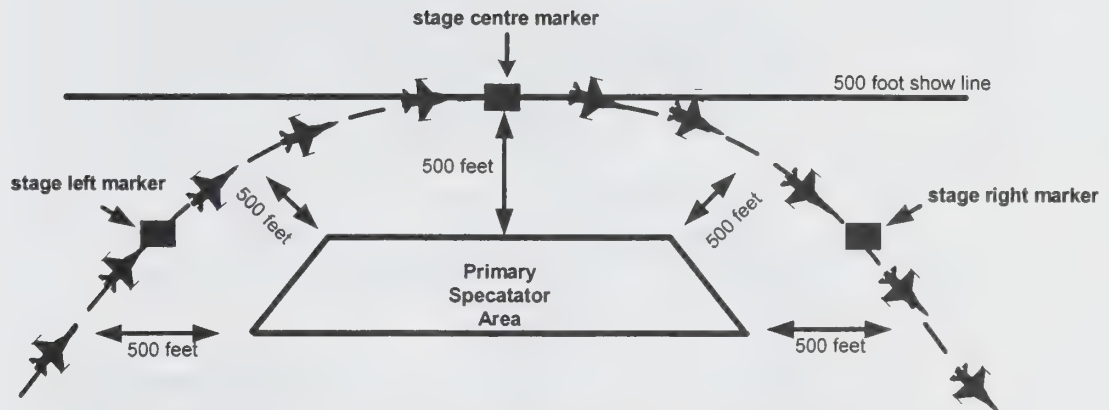


Diagram 12(a)



Note: As per ss. 623.07(5) this diagram illustrates how, during an arc-in-review manoeuvre, the minimum safety distance to be maintained between the aircraft and all boundaries of a primary spectator area is maintained at 500 feet. It also illustrates the location of stage markers which under the referenced provision, are to be clearly visible with appropriate vertical development for the location.

Diagram 13

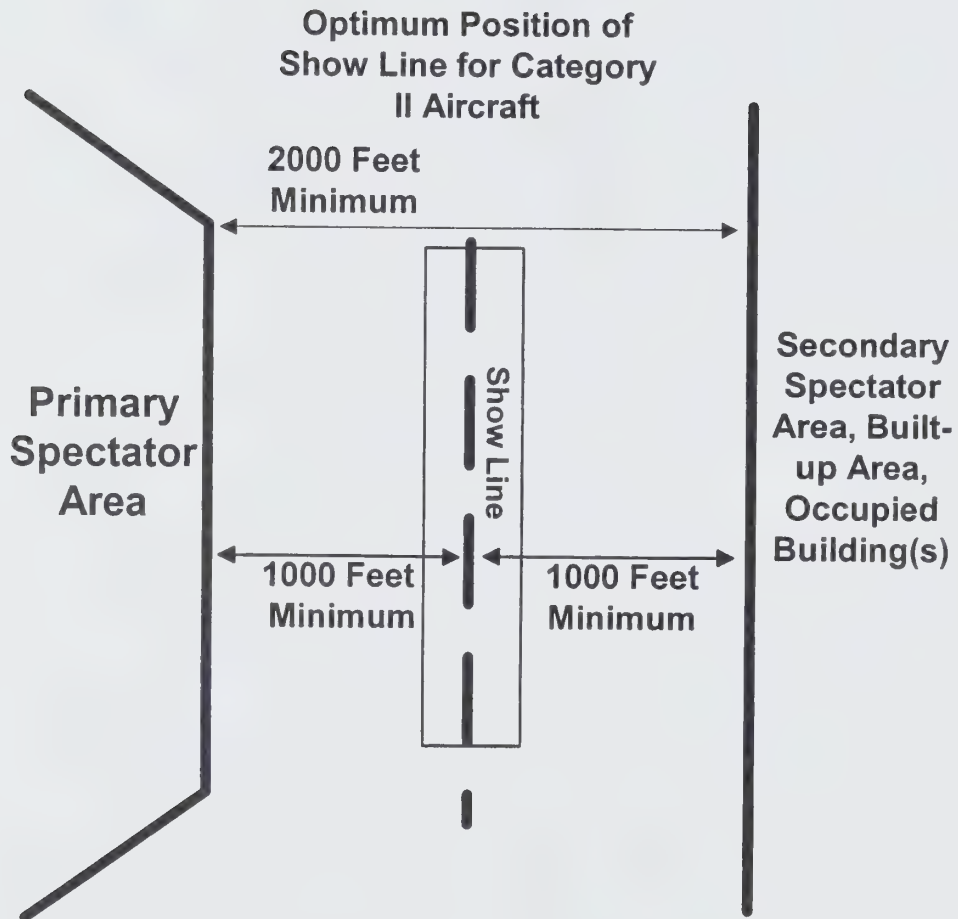


Diagram 13(a)

Position of the Show Line for Category II
Aircraft When Reduced Distance between the
Primary Spectator Area and the Show Line is
Approved

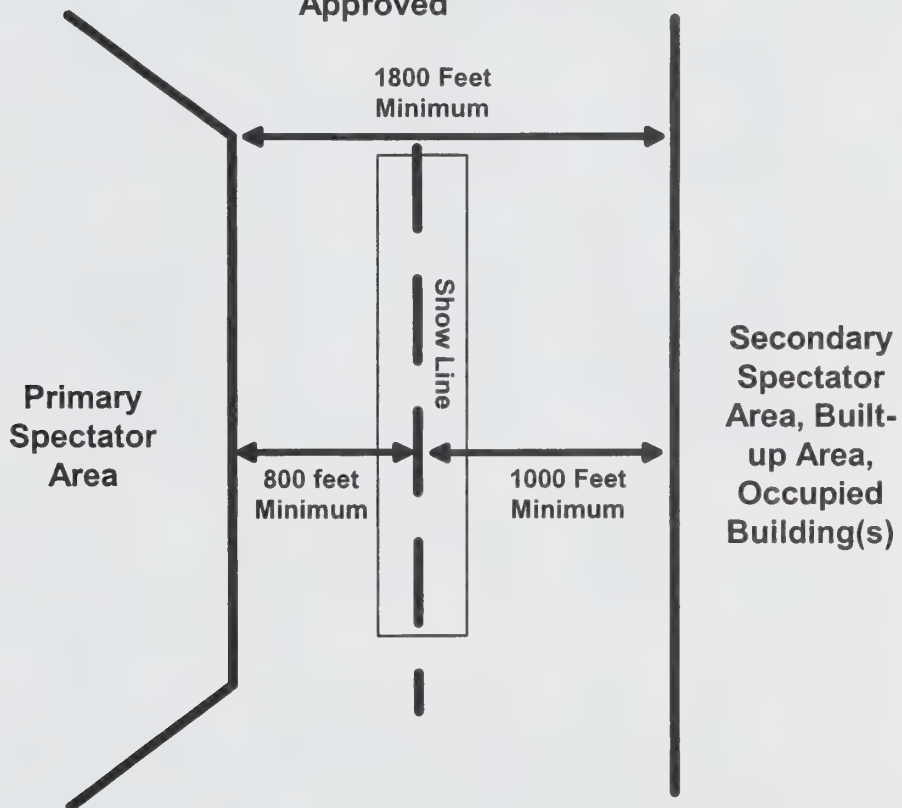


Diagram 14

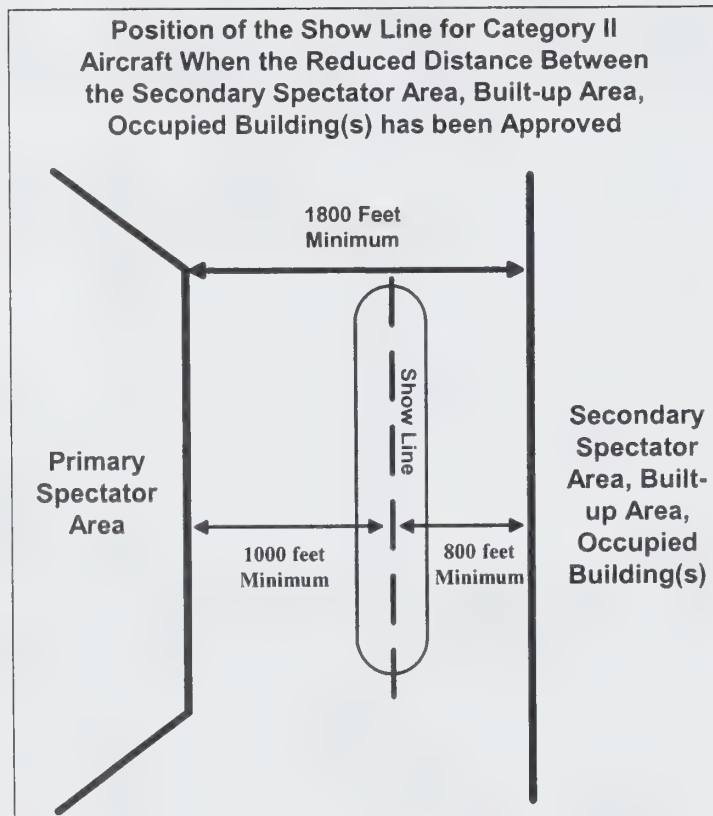
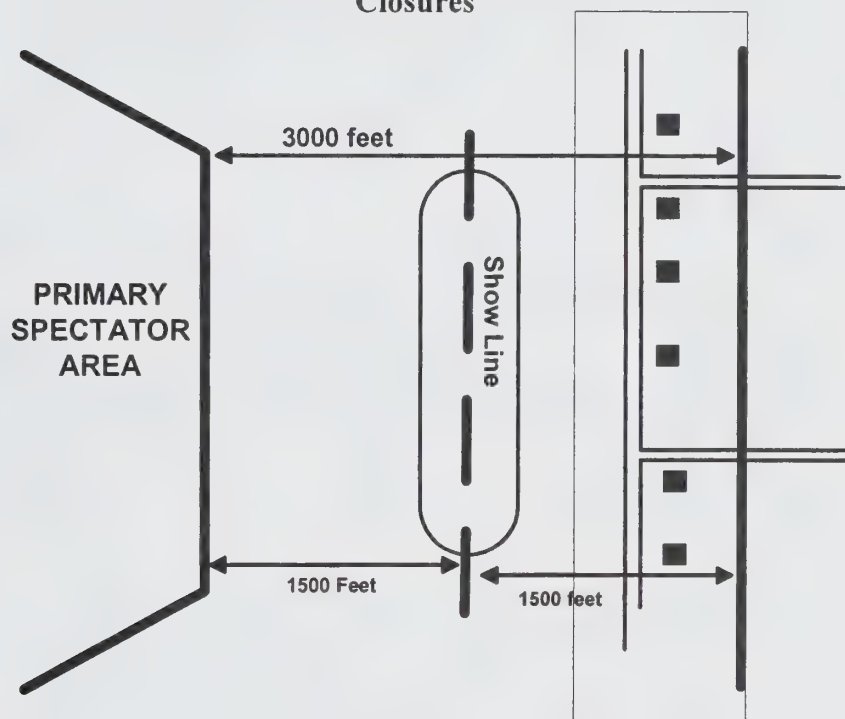


Diagram 15

**Example of "Category I Aircraft" Flying Display
Area Requiring Building Evacuation and Road
Closures**



Note: In the example depicted above, the buildings and the roads lie within the flying display area less than 1200 feet from the show line. As specified in paragraphs 623.07(1)(c) and (d), for this site layout to be approved, all buildings are to be vacated and road access denied to highlighted area.

Diagram 16

Aircraft Approach and Exit to and from a Flying Display Area Bordered by Built-up Areas or Secondary Spectator areas.

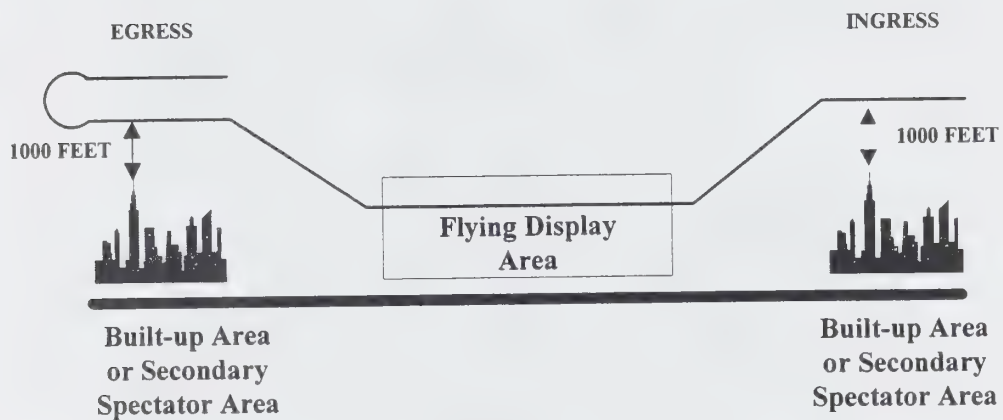
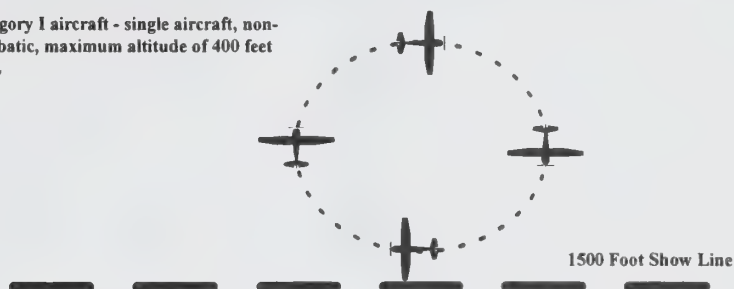


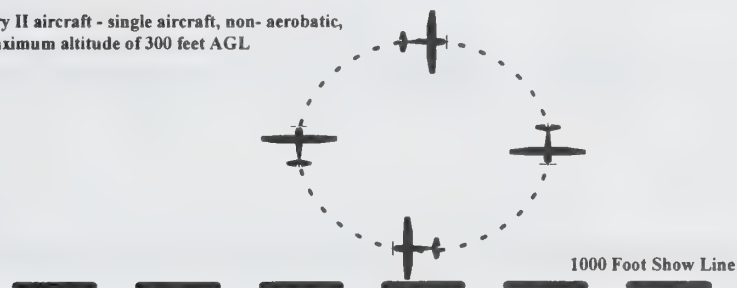
Diagram 17

Manoeuvres Toward the Primary Spectator Area - 360 Degree Turns

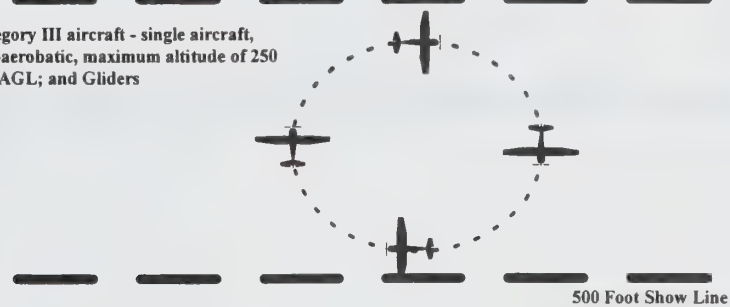
Category I aircraft - single aircraft, non-aerobatic, maximum altitude of 400 feet AGL



Category II aircraft - single aircraft, non-aerobatic, and maximum altitude of 300 feet AGL



Category III aircraft - single aircraft, non-aerobatic, maximum altitude of 250 feet AGL; and Gliders



Primary Spectator Area

Diagram 18

Non-Aerobatic Manoeuvres Toward the Primary
Spectator Area by a Single
Powered aircraft with 300 Knots IAS or less

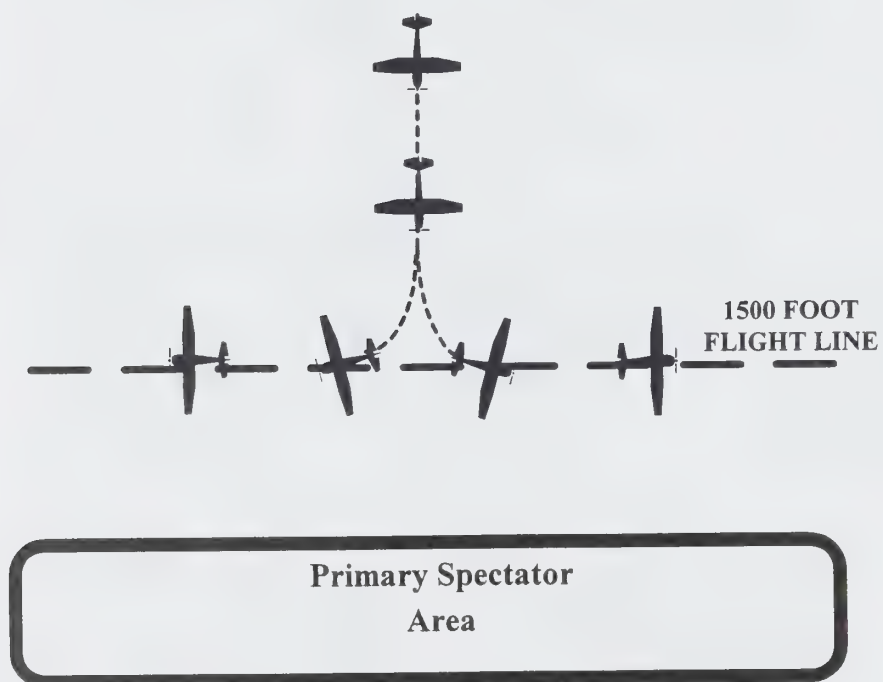
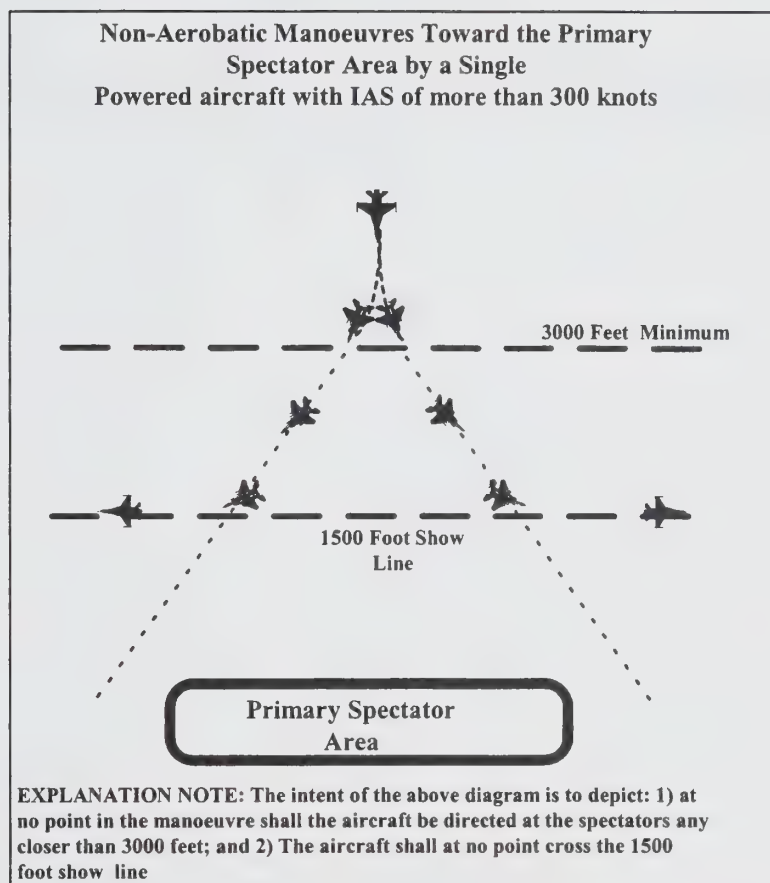


Diagram 19



Appendix A - Participant's Statement

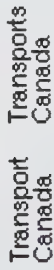
DATE: _____

Page _____ of _____

This is to certify that I have read and thoroughly understand and will comply with all the Conditions of Authorization contained in the Special Flight Operations Certificate - Special Aviation Event issued for _____
(Name of Special Event)

Participant's Name	Participant's Signature
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
11. _____	_____
12. _____	_____
13. _____	_____
14. _____	_____
15. _____	_____

Appendix B - Special Aviation Event Flight Program



Transport
Canada

**SPECIAL AVIATION
EVENT
FLIGHT PROGRAM**

**MANIFESTATION AÉRONAUTIQUE
SPECIALE
PROGRAMME DE VOL**

Name of Event / Titre de la manifestation		Pilot Licence Licence du pilote		Name of Certificate Holder / Nom du Titulaire du certificat		Flight Operations Director / Directeur des opérations aériennes		Tel. No. - N° de tél.		Page of de
Pilot Name / Nom du pilote		Aircraft / Aéronef Type / Mod. Reg. / Imm.		Activity / Activité		Duration / Durée		Minimum altitude Altitude minimale		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
Air Display / Spectacle aérien				Start / Début		Finish / Fin		Remarks - Observations		
Signature of Certificate Holder / signature du Titulaire du certificat				Date						
Regional Manager – General Aviation / Gestionnaire régional, Aviation générale				Date						

26-0374 (10/04)

STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER TWO - BALLOON FESTIVALS

Foreword

These Special Flight Operations Standards and Procedures - Special Aviation Events - Balloon Festivals are the standards and procedures that must be met for the issue and continuing validity of a Special Operations Certificate - Balloon Festivals as provided for in the *Canadian Aviation Regulations*, Subpart 603, Division I, and the related guidance material.

Additional information on the organisation and administration of Special Aviation Events may be obtained by contacting your local Regional General Aviation Licensing Office of Transport Canada Aviation or by writing to the:

Chief, Recreational Aviation and Special Flight Operations
Transport Canada Aviation Building
Place de Ville
Ottawa, Ontario
K1A 0N8.

For ease of reference to the Regulations, the divisions and numbers of the Standards are assigned to correspond to the Regulations, therefore, Section 623.02 of the Standards would reflect a standard required by Section 603.02 of the Regulations.

In support of the Standards and for clarification, additional information may be found in the Appendices, in relevant Notes inserted throughout the Standards and in the *AIP Canada*.

**STANDARD 623 - SPECIAL FLIGHT
OPERATIONS
DIVISION I - SPECIAL AVIATION
EVENTS
CHAPTER TWO - BALLOON FESTIVALS**

(amended 1999/09/01)

623.00 Interpretation

In these Standards,

“air show” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, an aerial display or demonstration before an invited assembly of persons by one or more aircraft (*spectacle aérien*)
(amended 2006/06/30)

“balloon festival” means an event where one or more manned balloons will launch from or fly in into an area before an invited assembly of persons (*festival de ballons*)

“designated landing area” means any area identified by a Sponsor where balloons participating in a Balloon Festival will land, that:

(a) lies within a built-up area; or

(b) at which an invited assembly of persons is present (*zone d’atterrissage désignée*)

“designated launch area” means any area identified by a Sponsor from which balloons participating in a Balloon Festival will launch, that:

(a) lies within a built-up area; or

(b) at which an invited assembly of persons is present (*zone de décollage désignée*)

“designated target area” means any area identified by a Sponsor into which balloons participating in a Balloon Festival will fly as part of a pre-determined task, that:

(a) lies within a built-up area; or

(b) at which an invited assembly of persons is present (*zone cible désignée*)

“invited assembly of persons” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, any number of persons who have been invited, by any means, to attend a special aviation event. The term excludes competition judges, the holder of a special flight operations certificate, members of a certificate holder’s staff and members of a participant’s support team (*rassemblement de personnes invitées*)
(amended 2006/06/30)

“participant” means the balloonists (balloon pilots), the balloon chase crews, balloon task judges, and where other aircraft demonstrations are taking place in conjunction with the balloon launches, the aircraft flight crews, flight crew support staff, parachutists, or other essential personnel (participant)

“special aviation event” means pursuant to section 101.01 of the *Canadian Aviation Regulations*, an air show, a low-level air race, an aerobatic competition, a fly-in or a balloon festival (manifestation aéronautique spéciale)
(amended 2006/06/30)

“sponsor” means the person or agency responsible for the organisation and conduct of a special aviation event. (organisateur)

Information Note:

The popularity of the sport of ballooning in Canada has grown significantly in recent years. Coinciding with the growth in the sport, is the number of Special Aviation Events - Balloon Festivals held each year to showcase and promote the sport. These festivals may be fun events where the public is invited to watch the inflation and launches of balloons, fun events where the balloons attempt to fly into the festival site or they could be sanctioned balloon competitions for national or international honours in the ballooning community.

Regardless of the “raison d’être” for the Balloon Festival, Transport Canada is responsible for ensuring the safety of the public during the event.

**623.02 Issuance of a Special Flight Operations
Certificate - Special Aviation Event - Balloon Festival**

(1) An application to conduct a Special Aviation Event - Balloon Festival shall include:

- (a) the name, location and date of the event;
- (b) the expected number of spectators;
- (c) the name, address, telephone and facsimile numbers of the Sponsor of the event; and
- (d) a Balloon Festival Operations Manual for the festival.

(2) The Operations Manual shall contain as a minimum, the following information:

- (a) the names, addresses, telephone and facsimile numbers of the key management personnel for the festival (e.g. Sponsor, Balloon Meister, Safety Director);
- (b) the duties and responsibilities of each position identified in the festival management organisation;
- (c) copies of landowner permission and letters of non-objection from appropriate municipal authorities for the use of all proposed designated launch areas and sites to be designated as target or landing areas;
- (d) a copy of the festival site diagram;

(e) a list of all the proposed balloon events, tasks, races, etc. to take place during the festival;

(f) a copy of the procedures to be used to control the flight operations of the balloons including during launches, fly-in tasks landings, flight over built-up areas, etc.;

(g) a copy of the crowd control procedures to be used to ensure the safety of spectators at designated launch areas, designated target areas or designated landing areas. This shall include the method of separating the spectators from the balloons (e.g. snow fence) at the distances outlined in section 623.07 of these standards;

(h) for information purposes, a copy of the event's proposed Emergency Procedures developed in concurrence with the delegated agency appropriate to the festival site; and

(i) any other information pertinent to the safe conduct of the event as deemed necessary by the Minister.

(3) The festival site diagram shall be a 1:24,000 topographical chart or similar scale aerial photograph and shall clearly indicate, as a minimum, the following:

(a) location and marking of all designated launch areas and, if applicable, all designated target and landing areas;

(b) location and method of separating spectators from designated launch, landing and target areas, including gates;

(c) location of emergency vehicles;

(d) location of medical facilities;

(e) location of emergency access routes to and from the event site;

(f) festival central control;

(g) propane refuelling area (when located on site); and

(h) locations of other flight operations taking place at the festival (e.g. helipad, parachuting landing area).

(4) The application shall be received by the appropriate Regional General Aviation office sixty (60) days prior to the proposed date of the event, or by the date mutually agreed upon between Transport Canada and the Sponsor.

Information Note:

Failure to meet the 60 day or agreed upon date could result in the non-issue of the Special Flight Operations Certificate required for the event.

(5) The following information and/or documentation shall form part of an application and, unless mutually agreed upon between the Sponsor and Transport Canada, shall be submitted to the appropriate Regional General Aviation Licensing office in support of the application to conduct a special aviation event - balloon festival, no later than ten (10) working days prior to

the date of the proposed event:

- (a) a completed Special Aviation Event Flight Program Form (Form 26-0374 attached as Appendix B) identifying all participants. An alternate format may be used, providing it contains all the information required by Form 26-0374;
- (b) for foreign pilots, legible copies of pilot's licences and, where applicable, medical certificates; and
- (c) for foreign registered balloons with non-standard flight authorities, a Canadian Validation of the balloon's foreign flight authority.

Information Note:

It is suggested this information be forwarded to the appropriate Regional General Aviation Licensing office as soon as it is available.

623.05 Event Management

Information Note:

The sponsorship/management requirements of a balloon festival will vary. At a small event, one person may be able to co-ordinate more than one activity, while at a large event, an activity may be controlled by a committee of persons whose chairperson has been delegated the appropriate authority. The scope of any event will depend on the aviation interests of the community and other local conditions.

It is most important that the sponsor is aware that, since the Special Flight Operations Certificate is issued to him or her by the Minister, it is his or her responsibility to ensure that the event is conducted in such a way that the safety of persons and property on the ground is not jeopardised.

(1) Management Organisation

- (a) The sponsor of a Special Aviation Event shall be an individual or an organisation incorporated under the laws of Canada or a Province.
- (b) The sponsor of a Special Aviation Event has the overall responsibility for the conduct of the event in a safe manner and in accordance with the conditions contained in the Special Flight Operations Certificate issued for the Balloon Festival.
- (c) The sponsor may delegate to other persons the authority to organise and control particular aspects of the Balloon Festival on his or her behalf.
- (d) A sponsor shall have a management organisation capable of supervising and maintaining operational control over the Balloon Festival. While other position titles are acceptable, the management team shall collectively assume all of the responsibilities listed for the following sample positions:

- (i) The Sponsor is responsible for:

- (A) appointing the management organisation for the Balloon Festival to co-ordinate the various air, ground, safety and administrative activities at the Balloon Festival;
 - (B) establishing liaison with airport management and concerned local agencies;
 - (C) preparing a draft plan for the safe handling of spectators and the safe handling of aircraft, automobiles and other vehicles; and
 - (D) making application to the appropriate Regional Transport Canada General Aviation office for a Special Flight Operations Certificate for the Balloon Festival;
- (ii) The Balloon Meister shall act as the general manager of the Balloon Festival and is responsible for the overall co-ordination of activities at the Balloon Festival including:
- (A) ensuring that all staff members are properly informed of their duties and responsibilities in detail;
 - (B) cancelling or postponing the balloon launches in the event of an accident, bad weather, or any other circumstances relating to the safety of the spectators or participants; and
 - (C) the conduct of the flight operations at the Balloon Festival including:
 - (I) ensuring all balloonists are in possession of the appropriate pilot licences, medical certificates and aircraft documentation;
 - (II) ensuring balloonists are qualified, competent and have sufficient knowledge of these standards to participate in the Balloon Festival in accordance with the conditions of the Special Flight Operations Certificate issued for the Balloon Festival;
 - (III) ensuring each pilot participant signs the Participant's Statement attached to the certificate issued for the Balloon Festival and reproduced in this Chapter as Appendix A, and submitting a legible copy of the statement to the appropriate regional office on the first working day following the Balloon Festival;
 - (IV) providing a briefing and operations area of adequate size to accommodate the persons being briefed in accordance with section 623.09 of these standards; and
 - (V) conducting a participant's briefing in accordance with section 623.09 of these standards, and ensuring that balloonists who have not been briefed in accordance with that section do not participate in the Balloon Festival on that day.
- (iii) The Safety Director is responsible for crowd control and ground safety at the Balloon Festival.

Information Note:

It is not the intent of these standards to confine sponsors to any mandatory management organisation. The position titles within the management organisation outlined in sub-paragraphs (d)(i) to (iii) are offered as an example. Balloon Festival organisers may or

may not wish to use these position titles, but, under CAR 603.05, must ensure whatever structure they select is capable of maintaining supervision and operational control over the competition and that all responsibilities listed in subparagraphs (d)(i) to (iii) are clearly assigned to responsible persons.

(2) Crowd Control

(a) A sponsor shall ensure that sufficient clearly identified crowd control personnel are available, briefed on crowd control and emergency procedures and are capable of carrying out the duties assigned to them.

(b) The sponsor shall ensure that spectators:

(i) are kept at a safe distance from the balloons during inflation and take-off from designated launch areas; and

Information Note:

This may be done by fencing or roping off the launch area to segregate spectators from the balloons during inflation and take-off. At larger events this may be the only way to provide adequate crowd control to ensure spectator safety. At smaller events a "Fantasy Fence" has been utilised successfully. A "Fantasy Fence" consists of a length of visible rope laid out on the ground around the launch vehicle, basket assembly, etc. of the balloon and patrolled by a member of the balloon crew acting as a security person wearing a vest or other distinguishable guise to keep spectators out of the area marked by the rope. Launch directors assist in crowd control while supervising inflation and launch. Whatever the method and procedures chosen for crowd control, these must, under paragraph 623.02(2)(g) above, be clearly described in the Balloon Festival Operations Manual submitted with the application to conduct the event.

(ii) are separated from designated target and landing areas at the minimum distances stated in the Special Flight Operations Certificate issued for the Balloon Festival.

(3) Emergency Facilities

(a) A sponsor shall ensure that procedures, facilities, equipment and personnel are in place to respond to anticipated emergencies, including balloon accident or medical emergency involving the spectators.

Information Note:

Local police and hospitals should be aware of the festival dates and the expected size of the crowd.

The local Fire Department may be willing to provide equipment and personnel. For very small festivals, a jeep or other vehicle carrying fire fighting equipment may suffice. Appropriate medical facilities and personnel should be provided at all Special Aviation Events. The local St. John Ambulance Association may provide this assistance by prior arrangement.

Arrangements should be made to have a local doctor on call.

A station wagon, van or light truck, suitably identified, may be used where full ambulance service is not available.

(b) The sponsor shall ensure that emergency entrances, access lanes and exits are available to and from the festival site and procedures are in place to keep them clear in an emergency situation.

(c) Emergency entrances, access lanes and exits shall be clearly identified on the site diagram submitted in support of the application to conduct the Special Aviation Event.

623.06 Participant and Aircraft Eligibility

(1) Participant Eligibility

To be eligible to operate a balloon as part of a special aviation event, a person shall:

(a) hold a pilot's licence and medical validation appropriate to the balloon to be operated in the balloon festival;

(b) have a minimum of 50 hours total flying time in balloons;

(c) meet the recency requirements of CAR 401.05;

(d) sign the Participant's Statement attached to the Special Flight Operations Certificate issued for the Balloon Festival and reproduced in this Chapter as Appendix A; and

(e) attend a Participant's Briefing as outlined in section 623.09 of these standards.

Information Note:

The purpose of this section is to highlight an anomaly that exists in all segments of aviation but seems more prevalent at balloon festivals.

Reference in this regard should be made to section 401.04 of the CARs reproduced below for information purposes only:

No person shall act as a flight crew member or exercise the privileges of a flight crew licence in Canada in an aircraft registered in a contracting state other than Canada, unless the person holds, and can produce while so acting or while exercising such privileges,

(a) a flight crew licence issued under this Subpart; or

(b) a flight crew licence, or a document equivalent to a foreign licence validation certificate, that is issued under the laws of the contracting state.

This would mean that, in order to fly a balloon registered in a country other than Canada, a balloon pilot is required to hold:

(a) a Canadian Balloon Pilot licence; or

(b) a Balloon Pilot Licence issued or validated by the state in which the balloon is

registered.

Example:

An American pilot wishing to fly a British registered balloon in Canada would be required to:

(a) hold a British Balloon Licence;

(b) have his or her American Balloon Licence validated by the British Civil Aviation Authority; or

(c) obtain a Canadian Balloon Pilot Licence.

(2) Aircraft Eligibility

To be eligible to be operated in a Canadian Special Aviation Event, a balloon shall:

(a) be registered in Canada or in a contracting state; and

(b) have a flight authority.

Information Note:

This may be in the form of a Certificate of Airworthiness issued in accordance with Annex 8 of the ICAO Convention of Civil Aviation by the country of registration or a Canadian validation of a foreign non-standard flight authority issued by the country of registration. (e.g. Special Certificate of Airworthiness, Flight Permit, Laissez-passer Exceptionnel, etc.).

Operators of foreign civil aircraft, including balloons with non-standard flight authorities must, under CAR 507.05, obtain a Canadian validation of a Foreign Flight Authority prior to entering Canadian airspace. A Canadian validation may be obtained by providing the following information to Transport Canada Aviation at least 10 working days in advance of the event:

- a clear and legible copy of the aircraft's Certificate of Registration;*
- a clear and legible copy of the aircraft's flight authority including all operating conditions/limitations; and*
- the planned itinerary for the aircraft while in Canada, including dates and point of entry and departure from Canada.*

Although the responsibility for applying for a Canadian validation rests with the owner of the foreign aircraft, sponsors may co-ordinate compliance with this requirement in order to avoid confusion, last minute delays, or possible regulatory compliance action against a pilot who flies such an aircraft in Canada without authority.

623.07 Minimum Safety Distances and Altitudes from Spectators , Built-up Areas and Occupied Buildings

(1) Designated Launch Areas

- (a) Designated launch areas shall be under the direct control of the sponsor.
- (b) The sponsor shall have available at a designated launch area, a public address system or other means of providing directions to spectators and balloonists.

(2) Designated Target Areas

- (a) Designated target areas shall be positioned in such a manner that spectators are kept a minimum distance of 200 feet horizontally from the outer boundary of a target area.
- (b) Designated target areas shall be kept clear of all persons except those identified as essential personnel by a sponsor.
- (c) A sponsor shall have available at a designated target area, a public address system or other means of providing directions to spectators and balloonists.

(3) Designated Landing Areas

- (a) Spectators shall be kept a minimum of 200 feet horizontally from the outer boundary of a any designated landing area.
- (b) A designated landing area shall be no closer than 500 feet downwind of any designated target area.
- (c) Designated landing areas shall be under the direct and complete control of a sponsor.
- (d) A sponsor shall have available at a designated landing area a public address system or other means of providing directions to spectators and balloonists.
- (e) Designated landing areas shall be kept clear of all persons except those designated as essential personnel by a sponsor, e.g. balloon recovery crews.

(4) Special Conditions of Balloon Operations**(a) Minimum Altitudes and Distances During Flight**

Balloons operating in flight elsewhere than over a built-up area, an occupied building, or over an open air assembly of persons may be authorised in the Special Flight Operations Certificate - Balloon Festival to a distance no closer than 200 feet from any person, vessel, vehicle or structure.

Information Note:

The most common request for this authorisation comes when a body of water lies in close proximity downwind of a launch area. At many of these events, large numbers of pleasure boats anchor to observe the balloons. Many balloonists like to take this opportunity to carry out a "splash and dash" (dipping the basket of the balloon into the water). The problem is that this operation tends to attract the boats and makes it virtually impossible to maintain any distance between the boats and the balloons. Therefore, at some sites the reduction in this distance may not be granted. Balloonists should be cognisant of the requirement to begin

climbing immediately if it becomes evident that a boat or other vessel is infringing on the required separation distance.

(b) Approaches to Target and Landing Areas

Balloons on approach into an area identified in the Balloon Festival Operations Manual as a designated target area or as a designated landing area, may be authorised in the Special Flight Operations Certificate - Balloon Festival to fly over any spectator area to a minimum altitude of 75 feet above the spectators, provided that:

- (i) the spectator area is under the direct control of the sponsor; and
 - (ii) the balloon has achieved an altitude equilibrium at 75 foot above any spectator prior to reaching the spectator area.
- (c) Where the balloon achieves an equilibrium altitude at more than 75 feet over any spectators, further descent is prohibited.

623.08 Weather Conditions

(1) Subject to subsection (2), the Special Flight Operations Certificate issued for a Balloon Festival shall specify a minimum ceiling of 1,000 feet AGL and a minimum ground visibility of 3 miles.

(2) A Special Flight Operations Certificate referred to in subsection (1), may specify a higher ceiling minimum and a higher visibility minimum where justified by the presence of surrounding terrain or other local condition.

623.09 Participant's Briefing

Information Note:

The importance of the Participant's Briefing to the safe and successful conduct of a Special Aviation Event cannot be overemphasised. All aspects of the flying, ground, and emergency procedures of the proposed event should be reviewed. The briefing should be conducted in such a way, that every balloonist and all the event personnel in charge of the air, ground and emergency operations leaves the briefing with a clear understanding of their responsibilities and of procedures to be followed in normal or emergency situations that may occur during the course of the event. It is not sufficient to understand one's own tasks, but also to have a clear picture of how all aspects of the operation complement each other, especially in emergencies.

(1) General

(a) A participant's briefing shall be conducted prior to the beginning of each balloon launch at a festival, at a time as close to the proposed launch time as practicable.

Information Note:

At events that run for more than one day with early morning and early evening launches each day, it is common to have an in depth "master briefing" prior to the first launch of the festival.

This briefing includes all the information outlined in these standards. Briefings for subsequent flights are shorter in duration and include the roll call, weather briefing, problem identification and resolution from previous flights, etc. It is important to note that a balloonist that misses a "master briefing" is precluded from participating in subsequent launches until such time as he or she has received a complete briefing from the Balloon Meister or a person delegated to do so by the Balloon Meister.

(b) The briefing shall be carried out in an area as free of noise and other distractions as possible, and attendance shall be limited to flight crews, flight crew support staff, parachutists, and the persons responsible for the air, ground, safety and emergency operations for the event.

(c) Each pilot participant's attendance at the briefing shall be verified by roll call or otherwise and a record retained for submission to Transport Canada, if requested.

(d) Participants who did not attend a briefing shall not be permitted to participate in the launch associated with the briefing.

(2) Briefing Contents

The briefing shall cover the following basic actions, as a minimum:

(a) introduction of the key festival personnel and description of the means of communication with them;

(b) provision of a weather briefing covering aspects of weather that are relevant the conduct of the event, including cloud cover (ceiling), visibility, winds and temperature, density altitude and other current weather data, and forecast for the period of the event ;

(c) ensuring that the weather briefing referred to in (b) above is provided by the most qualified person available such as, but not limited to, a Flight Service Station Specialist, a meteorologist or an experienced pilot;

(d) description of the aerodrome air traffic zone details, i.e. position, dimensions, height above MSL, the airspace and content of the NOTAM issued for the balloon festival, including a description of local obstructions, warnings and other pertinent information, such as other nearby aerial activity;

(e) description of the method of co-ordinating air traffic, including type of co-ordination such as positive control by ATS, advisory by FSS or other type of co-ordination, as well as, if necessary, a description of radio frequencies used at the festival and assignment of radio call signs;

(f) description of the methods of suspending or cancelling a launch;

(g) description of the event site, designated target and landing areas including the position of the spectators, alternate landing areas, prohibited zones, and other relevant items by using aerial photographs, maps, scale diagrams, and other material;

(h) description of the fire fighting and emergency services equipment available, including their location and the access routes to be kept clear; and

(i) any other basic action deemed necessary.

**623.16 Carriage of Fare-Paying Passengers at a
Balloon Festival**

Information Note:

At Balloon Festivals it is a common practice for either the festival organisers or individual balloonists to offer balloon rides to members of the public for a fee. If a balloonist receives remuneration directly or indirectly for carrying passengers at an event for which a Special Flight Operations Certificate - Balloon Festival has been issued, the requirements of Part VI, Subpart 3, Division II of the Canadian Aviation Regulations must be met.

The authority to carry fare-paying passengers may be obtained in two ways:

(a) Individual balloonists may apply for and obtain a Special Flight Operations Certificate - Balloons with Fare-Paying Passengers:

or

(b) A Sponsor of a Balloon Festival may choose to apply for authorisation to carry fare-paying passengers at a festival. In this scenario, the Sponsor becomes the balloon operator and must meet the requirements of Part VI, Subpart 3, Division II of the *Canadian Aviation Regulations*. If approved, the authority would be a Special Condition of Balloon Operation in the Special Flight Operations Certificate issued for the festival.

Appendix A

DATE :

Page ____ of ____

PARTICIPANT'S STATEMENT

This is to certify that I have read and thoroughly understand and will comply with all the Conditions contained in the Special Flight Operations Certificate issued for

(enter name of Special Event).

Participant's Name	Participant's Signature
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
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14. _____	_____
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Transport
Canada

**SPECIAL AVIATION
EVENT
FLIGHT PROGRAM**

**MANIFESTATION AÉRONAUTIQUES
SPECIALES
PROGRAMME DE VOL**

Name of Event - Titre de la manifestation		Name of Sponsor - Organisé par		Director, Flight Operations Directeur, opérations aériennes	Tel. No. - N° de tél.	Page of de
Pilot Name - Nom du pilote		Pilot Licence Licence du pilote	Aircraft - Aéronaf Type - Mod. Reg. - Imm.		Activity - Activité	Duration - Durée
Minimum altitude Altitude minimale						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Air Display - Spectacle aérien		Start-Début	Finish-Fin		Remarks - Observations	
Signature of Sponsor - signature de l'organisateur				Date		
Regional Director - Aviation Licensing - Directeur régional, Licences aéronautiques				Date		

26-0374

STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER THREE - AEROBATIC COMPETITIONS

Foreword

These Special Flight Operations Standards and Procedures - Special Aviation Events - Aerobatic Competitions are the standards and procedures that must be met for the issue and continuing validity of a Special Flight Operations Certificate - Aerobatic Competition as provided for in the *Canadian Aviation Regulations*, Part VI, Subpart 3, Division I, and the related guidance material.

Additional information on the organisation or administration of Special Aviation Events may be obtained by contacting your local Regional General Aviation Office of Transport Canada, Civil Aviation, or by writing to the :

Chief, Recreational Aviation and Special Flight Operations
Transport Canada Aviation Building
Place de Ville
Ottawa, Ontario
K1A 0N8

STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER THREE - AEROBATIC COMPETITIONS

(amended 1999/09/01)

623.00 Interpretation

In these Standards,

“aerobatic competition box” means a block of airspace whose dimensions and location are specified in the certificate issued for the event; (zone de compétition d’acrobaties aériennes)

Information Note :

The International Aerobatic Club and the FAA define the “Aerobatic Contest Box” as a block of airspace 3,300 feet long, 3,300 feet wide with an upper limit of 3,500 feet AGL for powered aircraft and 4,000 feet AGL for gliders. The lower limit of the competition box for powered aircraft is 1,500 feet AGL for Basic and Sportsman Categories, 1,200 feet AGL for Intermediate Category, 800 feet AGL for the Advanced Category and 328 feet AGL for the Unlimited Category. For gliders, the lower limit of the competition box is 1,500 feet AGL for the Sportsman Category, 1,200 feet AGL for Intermediate Category and 600 feet AGL for the Unlimited Category. (see diagrams Aerobatic #1 and #2)

“designated spectator area” or “crowd” means the area identified on the site diagram submitted to Transport Canada with a sponsor’s application to conduct a special aviation event as the area in which an invited assembly of persons will be positioned; (zone réservée aux spectateurs)ou (foule)

“invited assembly of persons” means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, any number of persons who have been invited, by any means, to attend a special aviation event. The term excludes competition judges, the holder of a special flight operations certificate, members of a certificate holder’s staff and members of a participant’s support team; (*rassemblement de personnes invitées*)
(amended 2006/06/30)

“participant” means any individual directly involved in or participating in the competition. Participants include, but are not limited to, pilots, competition starters, judges, flight line crews, recorders or other persons designated by the Contest Director to perform duties associated with the competition; (*participant*)

“sponsor” means the person or agency responsible for the organisation and conduct of a special aviation event; (*organisateur*)

“technical inspection” means an inspection carried out by the Chief Technical Monitor as outlined in section 2.3 of the Aircraft and Equipment Entrance Requirements published in the International Aerobatic Club Official Contest Rules (inspection technique)

“unofficial spectator area” means an area adjacent to the flying display area where persons have congregated to observe a special aviation event. This includes, but is not limited to, private property or property not under control of the sponsor, public roads and rights of way. (*zone non officielle de spectateurs*)

623.02 Issuance of a Special Flight Operations Certificate - Special Aviation Event - Aerobatic Competitions

(1) An application to conduct a Special Aviation Event - Aerobatic Competition shall include :

- (a) the name, location and date of the event;
- (b) when persons have been invited, the expected number of spectators, fly-in aircraft and public vehicles;

Information Note :

Transport Canada recognises that the public is generally not invited to aerobatic competitions. In cases where they have been invited, only an estimate of the number of persons expected and any associated aircraft and vehicles is required.

- (c) the name, address, telephone number and, where applicable, the facsimile number of the Sponsor of the event;
- (d) the names, addresses, telephone numbers, and where applicable, the facsimile numbers of the key management personnel of the event (e.g. Contest Director, Chief Judge, Chief Technical Monitor, Safety Director
- (e) the name of the country of registration (Canada or Foreign Civil) of the proposed participating aircraft; and
- (f) a diagram of the event site which shall be on a 1:24,000 topographic chart or a similar scale aerial photograph, and shall clearly indicate as a minimum the following :
 - (i) the dimensions and the location of the boundaries of the aerobatic competition box;
 - (ii) the location and type of fencing around the designated spectator area including gates, if applicable;
 - (iii) the location of emergency access routes to and from the event site;
 - (iv) aircraft movement areas;
 - (v) the visiting aircraft parking area; and
 - (vi) the refuelling area.

(2) The application shall be received by the appropriate Regional General Aviation office at least sixty (60) days prior to the proposed date of the event, or by the date mutually agreed

upon between Transport Canada and the sponsor.

623.05 *Event Management*

(1) Management Organisation

- (a) The sponsor of a Special Aviation Event shall be an individual or an organisation incorporated under the laws of Canada or a province.
- (b) The sponsor of a Special Aviation Event has the overall responsibility for the conduct of the event in a safe manner and in accordance with the conditions contained in the Special Flight Operations Certificate issued for the competition.
- (c) The sponsor may delegate to other persons the authority to organise and control particular aspects of the competition on his or her behalf.
- (d) A sponsor shall have a management organisation capable of supervising and maintaining operational control over the competition. While other position titles are acceptable, the management team shall collectively assume all of the responsibilities listed for the following sample positions :
 - (i) the Sponsor is responsible for :
 - (A) appointing the management organisation for the competition to co-ordinate the various air, ground, safety and administrative activities at the competition;
 - (B) establishing liaison with airport management and concerned local agencies;
 - (C) preparing a draft plan for the safe handling of spectators, aircraft, automobiles and other vehicles; and
 - (D) making application to the appropriate Regional Transport Canada General Aviation office for a Special Flight Operations Certificate for the competition;
 - (ii) the Contest Director shall act as the general manager of the competition and is responsible for the overall co-ordination of activities at the competition including :
 - (A) ensuring that all staff members are properly informed of their duties and responsibilities in detail;
 - (B) cancelling or postponing the competition in the event of an accident, bad weather, or any other circumstances relating to the safety of the spectators or participants; and
 - (C) the conduct of the flight operations at the competition including;
 - (I) ensuring all participants are in possession of the appropriate pilot licences, medical certificates and aircraft documentation;
 - (II) ensuring participants are qualified, competent and have sufficient knowledge of these standards to compete in the competition in accordance with the conditions of the Special Flight Operations Certificate issued for the competition;

- (III) authorising a person to participate in the competition;
 - (IV) ensuring each pilot participant signs the Participant's Statement appended as Appendix A and submitting a legible copy of the statement to the appropriate regional office the first working day following the competition; and
 - (V) providing a briefing and operations area of adequate size to accommodate the persons being briefed in accordance with section 623.09 of these standards; and conducting a participant's briefing in accordance with section 623.09, and ensuring that pilots who have not been briefed in accordance with that section do not participate in the contest on that day;
- (iii) the Safety Director is responsible for flight line control and ground safety at the competition;
 - (iv) the Chief Technical Monitor is responsible for performing a technical inspection of each aircraft competing in the competition.

Information Note :

The person appointed Chief Technical Monitor should hold an AME licence; but the position may be filled by a person deemed "best qualified" by the Contest Director.

It is not the intent of these standards to confine sponsors to any mandatory management organisation. The management organisation (position titles) outlined in sub-paragraphs(d)(i) to (iv) has served as an adequate model . Competition organisers may or may not wish to use these position titles, but must, under CAR 603.05, ensure whatever structure they select is capable of maintaining supervision and operational control over the competition and that all responsibilities listed in sub-paragraphs (d)(i) to (iv) are clearly assigned to responsible persons.

(2) Crowd Control

- (a) A sponsor shall ensure that sufficient clearly identified crowd control personnel are available and briefed on crowd control and emergency procedures.
- (b) The designated spectator area shall be positioned so that no spectator is closer than the minimum distance from aircraft in flight, taking off, landing, or performing as specified in section 623.07 of these standards.
- (c) The sponsor shall ensure continuous separation between non-participants (spectators) and the aerobatic competition box, aircraft movement areas and access routes for emergency vehicles during the competition.

Information Note :

There are no specific requirements regarding the type of fence used, but the sponsor should ensure that if, for example, a rope barrier is used, sufficient crowd control personnel are on duty to ensure that the spectators remain behind it. Snow fencing has been used successfully as a temporary crowd restraining barrier. It is relatively easy to erect and remove, and requires fewer personnel to monitor than a rope fence. Snow fencing is often available on a loan or rental basis from the airport authority or from Provincial Highways Departments.

(3) Emergency Facilities

- (a) A sponsor shall ensure that procedures, facilities, equipment and personnel are in place to respond to anticipated emergencies, including aircraft accident or medical emergency involving the spectators.

Information Note :

Local police and hospitals should be aware of the competition dates and the expected size of the crowd.

Many airports have complete crash/fire/rescue equipment and personnel on the site and available on request. At other localities, the local Fire Department may be willing to provide equipment and personnel. For very small competitions, a jeep or other vehicle carrying fire fighting equipment may suffice. Appropriate medical facilities and personnel should be provided at all Special Aviation Events. At large air competitions, full medical aid facilities should be provided on site, including doctor, nurse, ambulance and medical centre. At small competitions, facilities should be provided for the treatment of minor injuries. The local St. John Ambulance Association may provide this assistance by prior arrangement. Arrangements should be made to have a local doctor on call.

A station wagon, van or light truck, suitably identified, may be used where full ambulance service is not available.

- (b) The sponsor shall ensure that emergency entrances, access lanes and exits are available to and from the competition site and procedures are in place to keep them clear in an emergency situation.
- (c) Emergency entrances, access lanes and exits shall be clearly identified on the site diagram submitted in support of the application to conduct the Special Aviation Event.

(4) Air Traffic Control

- (a) At Special Aviation Events where Air Traffic Control or advisory service is provided :
- (i) the sponsor shall ensure that Air Traffic Procedures are developed to conform with procedures established by agencies responsible for the competition site and airspace; and
 - (ii) a method of communication shall be established between Air Traffic Control staff and the person designated the responsibility for the conduct of the flight operations at the competition.

(b) At Special Aviation Events where Air Traffic Control or advisory service is not provided, the sponsor shall ensure that communication between the person responsible for flight operations and aircraft participating in the competition is provided.

623.06 Participant and Aircraft Eligibility

(1) Participant Eligibility

(a) To be eligible to operate an aircraft in an aerobatic competition, a person shall:

- (i) hold a pilot licence and medical certificate appropriate to the aircraft to be operated in the special aviation competition; and
- (ii) be authorised by the sponsor.

(b) Prior to authorising a person to operate an aircraft in an aerobatic competition, the sponsor shall confirm that:

- (i) the person meets the requirements of subparagraph (a)(i); and
- (ii) the aircraft to be operated meets the eligibility requirements of subsection (2).

(c) Passengers shall not be carried on board the aircraft, except that during competition flights in Basic or Sportsman, safety pilots may be carried.

(d) Each pilot participating in the competition shall sign the Participant's Statement attached to the Special Flight Operations Certificate issued for the competition.

(2) Aircraft Eligibility

To be eligible to be operated in a Canadian Special Aviation Event - Aerobatic Competition, an aircraft shall :

- (a) be registered in Canada or in a contracting state;
- (b) have a flight authority;

Information Note :

The flight authority may be in the form of a Certificate of Airworthiness issued in accordance with Annex 8 of the ICAO Convention of Civil Aviation by the country of registration or a Canadian validation of a foreign non-standard flight authority issued by the country of registration. (e.g. Special Certificate of Airworthiness, Flight Permit, Laissez-passer Exceptionnel, etc.);

Under CAR 507.05, operators of foreign civil aircraft with non-standard flight authorities must obtain a Canadian validation of a Foreign Flight Authority prior to entering Canadian airspace. A Canadian validation may be obtained by providing the following information to Transport Canada Aviation at least 10 working days in advance of the event :

- a clear and legible copy of the aircraft's Certificate of Registration;

- a clear and legible copy of the aircraft's flight authority including all operating conditions/limitations; and
 - the planned itinerary for the aircraft while in Canada, including dates and point of entry and departure from Canadian airspace and all Special Aviation Events in which the aircraft intends to participate.
- (c) undergo a technical inspection; and
 - (d) be authorised by the Sponsor.

623.07 Minimum Safety Distances and Altitudes from Spectators, Built-up Areas and Occupied Buildings

(1) The aerobatic competition box shall be positioned in a manner that aircraft operating in the aerobatic competition box can adhere to the provisions of section 602.14 of the CARs, except that :

- (a) where the public has been invited to view the competition, a designated spectator area shall be positioned on one side only of the aerobatic competition box; and
- (b) the designated spectator area shall be positioned no closer than 500 feet from the outer edge of the competition box.

(2) Aircraft shall take-off or land on a runway or an area no closer than a distance of 200 feet from any spectators.

623.08 Weather Conditions

The minimum weather conditions for the conduct of a Special Aviation Event - Aerobatic Competition shall be a ground visibility of 3 miles and a ceiling 500 feet above the upper limits of the competition box for the category of competition.

Information Note:

As an example, the minimum ceiling for Basic and Sportsman powered aircraft is 4,000 feet AGL.

623.09 Participant's Briefing

Information Note:

The importance of the Participant's Briefing to the safe and successful conduct of a Special Aviation Event cannot be overemphasised. It is a safety briefing at which all aspects of the flying, ground, and emergency procedures of the proposed competition should be reviewed. The briefing should be conducted in such a way, that every pilot participant and competition personnel in charge of the air, ground and emergency operations leaves the briefing with a clear understanding of their responsibilities and of procedures to be followed in normal or

emergency situations that may occur during the course of the competition.

(1) General

- (a) A participant's briefing shall be conducted prior to the competition at a time as close to the start of the competition as practicable.
- (b) The briefing shall be carried out in an area as free of noise and other distractions as possible and attendance shall be limited to pilots participating in the competition and key competition personnel responsible for the air, ground, safety and emergency operations for the competition.
- (c) Each pilot participant's attendance at the briefing shall be verified by roll call or otherwise and a record retained for a minimum of sixty (60) days.
- (d) Pilot participants who did not attend the briefing shall not be permitted to participate in the competition on that day.

(2) Briefing Content

The briefing shall cover the following basic actions, as a minimum :

- (a) introduction of the key competition personnel and description of the means of communication with them;
- (b) provision of a weather briefing covering aspects of weather that are relevant to the conduct of the competition, including cloud cover (ceiling), visibility, winds and temperature, density altitude and other current weather data, and forecast for the period of the competition;
- (c) ensuring that the weather briefing referred to in (b) above is given by a Flight Service Station Specialist if one is available, otherwise by an experienced pilot;
- (d) description of the aerodrome air traffic zone details, i.e. position, dimensions, height above MSL, and details of the *NOTAM* issued for the competition, including local obstructions, warnings and other pertinent information, such as bird activity and nearby aerial activity;
- (e) description of the method of co-ordinating air traffic, including type of co-ordination such as positive control by ATS, advisory by FSS or other type of co-ordination, as well as, if necessary, a description of frequencies and assignment of radio call signs;
- (f) description of the methods of suspending the performance or recalling a pilot participant by both radio and visual signals;
- (g) description of the fire fighting and emergency services equipment available, including their location and the access routes to be kept clear; and
- (h) any other basic action deemed necessary.

Information Note:

Examples of topics that have been included in briefings are medical factors affecting pilot performance, e.g. over the counter medication, pilot fatigue, heat stress and factors affecting orientation of flight over water demonstrations or unusual terrain.

(3) Participant's Statement

Personnel designated by the sponsor shall ensure that :

- (a) each pilot participant reads the Special Flight Operations Certificate issued for the competition;
- (b) each pilot participant has signed the Participant's Statement reproduced in this Chapter as Appendix A;
- (c) each pilot participant who has not complied with subparagraphs (a) and (b) is not allowed to participate in the competition; and
- (d) at the end of a briefing, a copy of the Statement is given to the monitoring Civil Aviation Inspector or, if one is not on site, that a copy of the Statement is forwarded to Transport Canada Aviation, General Aviation, on the first working day following the competition.

Appendix A

DATE:

Page ____ of ____

PARTICIPANT'S STATEMENT

This is to certify that I have read and thoroughly understand and will comply with all the conditions contained in the Special Flight Operations Certificate issued for
(.....).

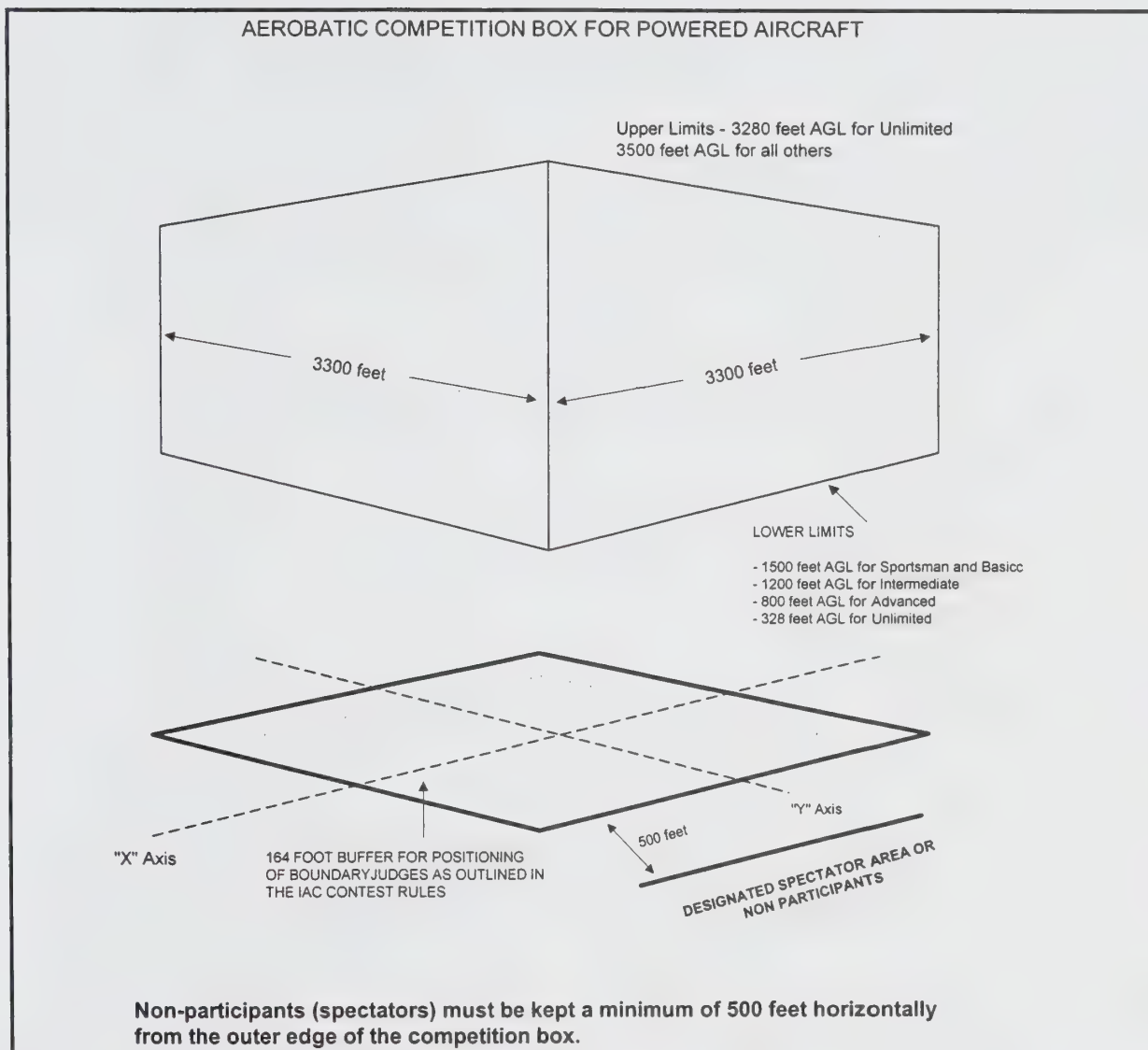
name of Special Event

Pilot Participant's Name

Pilot Participant's Signature

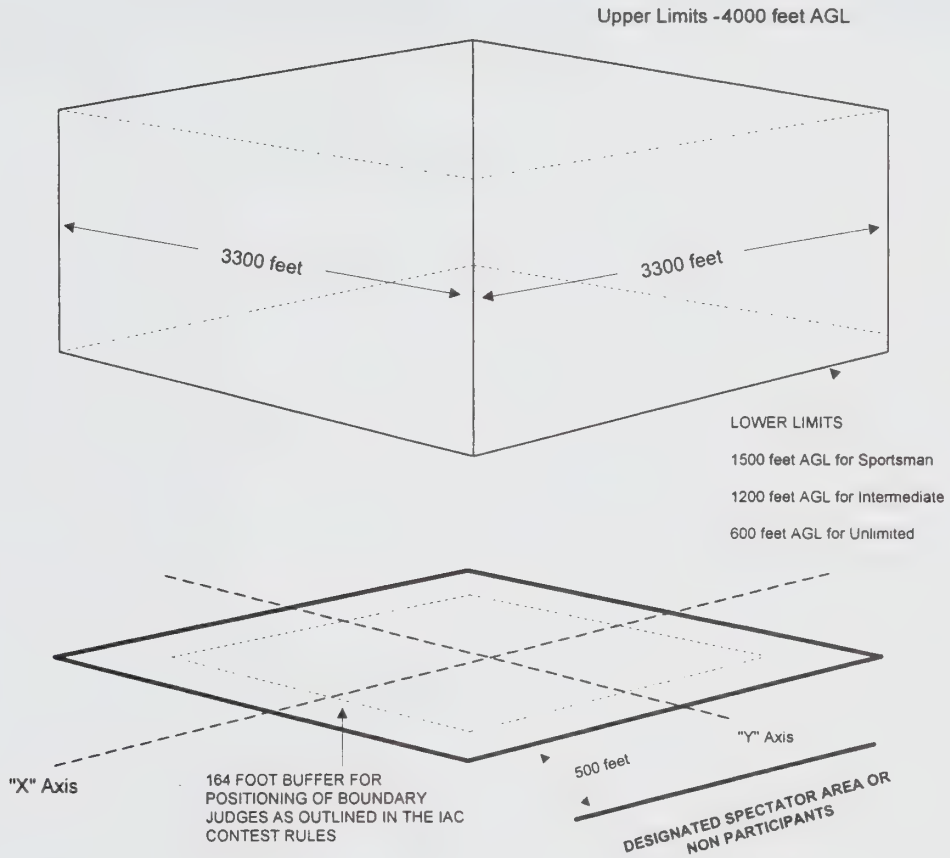
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Aerobatic # 1



Aerobatic # 2

AEROBATIC COMPETITION BOX FOR GLIDERS



Non-participants (spectators) must be kept a minimum of 500 feet horizontally from the outer edge of the competition box.

STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER FOUR - LOW LEVEL AIR RACES

Note:

These races are a rare occurrence in Canada. Standards will be developed and published as required in consultation and harmonization where possible with the FAA and race organizations.

STANDARD 623 - SPECIAL FLIGHT OPERATIONS

DIVISION I - SPECIAL AVIATION EVENTS CHAPTER FIVE - FLY-INS

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CANADIAN AVIATION REGULATIONS

GENERAL OPERATING AND FLIGHT RULES STANDARDS

623 - SPECIAL FLIGHT OPERATIONS

DIVISION II - BALLOONS WITH FARE-PAYING PASSENGERS

DIVISION III - PARACHUTING

DIVISION IV - MISCELLANEOUS SPECIAL FLIGHT OPERATIONS



Canada

Special Flight Operations Standards

Foreword

These Special Flight Operations Standards outline the requirements for complying with the Regulations Respecting Special Flight Operations (Canadian Aviation Regulations Part VI, Subpart 3, Divisions I, II, III and IV).

For ease of cross reference the divisions and numbers of the standard are assigned to correspond to the regulations, therefore Standard 623.06 would reflect a standard required by Canadian Aviation Regulation (CAR) 603.06.

Special Flight Operations Standards

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PART VI - GENERAL OPERATING AND FLIGHT RULES

623 - SPECIAL FLIGHT OPERATIONS STANDARDS

DIVISION I - SPECIAL AVIATION EVENTS

The Special Flight Operations Standards and Procedures - Division I - Special Aviation Events are produced in a separate document.

DIVISION II - BALLOONS WITH FARE-PAYING PASSENGERS

623.18 *Issuance of a Special Flight Operations Certificate - Balloons*

The following constitutes an application for the issuance of a Special Flight Operations Certificate - Balloons:

- (1) The name, address, and where applicable, the telephone and facsimile number of the balloon operator;
- (2) The types and registration marks of balloons to operated;
- (3) The name, address, and where applicable, the telephone and facsimile number of the person to be designated to act as maintenance coordinator; and
- (4) If the applicant intends to operate more than one balloon, the name, address, and where applicable, the telephone and facsimile number of the person designated the responsibilities of operational control over the flight operations.

623.21 *Crew Member Qualifications and Currency Requirements*

- (1) Subject to subsection (2) balloon pilots operating balloons carrying fare-paying passengers shall:
 - (a) be at least eighteen years of age;

- (b) hold a Balloon Pilot Licence issued by the Minister;
- (c) hold a Medical Certificate, Category 1 or 3; and
- (d) have accumulated a minimum of 50 hours flight-time in untethered balloons or be the holder of a Canadian Balloon Licence with a valid Flight Instructor Rating - Balloon Category.

(2) Where the pilot-in-command is a foreign licensed pilot operating a foreign registered balloon in accordance with a Special Flight Operations Certificate - Special Aviation Event, the pilot-in-command shall:

- (a) be at least eighteen years of age;
 - (b) have accumulated a minimum of 50 hours flight-time in untethered balloons; and
 - (c) possess a medical fitness equivalent to that of the ICAO Class 2 Medical Assessment (Canadian Category 3).
- (amended 1999/09/01)

(3) Prior to operating a balloon, a pilot must demonstrate within the preceding twelve (12) months, a satisfactory level of knowledge and ability to perform normal and emergency operating procedures on the specific AX class of balloon to be operated.

(4) The holder of a Special Flight Operations Certificate - Balloons shall maintain, for a period of two years, records of when and how the determinations in subparagraphs (3) were made (oral or written examination, flight evaluation, or a combination thereof) and make such records available to the Minister upon request.

623.22 *Balloons - Briefing of Passengers*

(1) Passengers shall be given a safety briefing prior to the commencement of the inflation of a balloon.

(2) A passenger safety briefing shall include, as a minimum, the following topics:

- (a) a general overview of the flight (expected length of the flight, different phases of the flight from inflation to landing, etc.);

- (b) where to position themselves during inflation;
- (c) the location of emergency equipment (fire extinguisher, drop line, first aid kit, etc.)
- (d) the rules pertaining to smoking;
- (e) the dangers relating to the fan;
- (f) the dangers relating to the hot phase of the balloon inflation;
- (g) the procedures to be followed for entering and exiting the basket;
- (h) where the passengers are to position themselves in the basket;
- (i) the procedures to be followed during landing (handholds, bracing, not to leave basket until directed to do so, etc.); and
- (j) the procedures to be followed during the deflation of the balloon.

623.25 External Carriage of Passengers

Standards to be developed as required.

623.26 Leaving a Balloon in Flight

Standards to be developed as required.

Division III

Parachute Descents

Parachute Descents In or Into Controlled Airspace or an Air Route

- 623.36** (a) This section contains the standards applicable to conducting parachute descents in or into controlled air space or an air route.

623.38

Issuance of a Special Flight Operations Certificate - Parachuting**(A) Application for Issuance of a Special Flight Operations Certificate**

Information Note: It is not the intent or policy of Transport Canada to prevent parachute descents in or into controlled airspace. Parachute operations can be carried out safely in airspace shared by others users (gliders, flight training, etc.) with proper coordination. The purpose of these standards is to ensure that adequate coordination with Air Traffic Services is carried out and that sufficient notice to other airspace users is given prior to the activity taking place.

- (1) The following constitutes an application to conduct a parachute descent in or into controlled air space or an air route:
 - (a) the name, address and where applicable, the telephone and facsimile numbers of the applicant;
 - (b) the dates and times of the proposed parachute descents;
 - (c) for information purposes, the make, model and registration of the parachute jump aircraft;

Information Note: It is not the intent of these standards to prevent an applicant from making substitutions for proposed aircraft that are not available.

- (d) the requested altitude(s) of the parachute descents, above sea level;
 - (e) the location of the proposed parachute landing area;

Information Note: This shall include the latitude/longitude, an accurate geographical description and where the parachute landing area is within a 20 nautical mile radius of a navigation aid, the bearing and distance from the navigation aid.

- (f) where the proposed parachute descents are to take place at an airport or aerodrome, declaration that the airport manager or aerodrome operator have been advised of the proposed parachute descents and have no objection;
 - (g) where the proposed parachute descents are to take place onto private property, declaration that the landowner or tenants

have been advised of the proposed parachute descents and have no objection;

- (h) the method by which the Parachute Landing Area Supervisor shall communicate with the jump aircraft.
- (2) The application shall be received by the appropriate Regional Transport Canada General Aviation Office, a minimum of 10 working days prior to the date of the proposed parachute descent(s), or by a date mutually agreed upon between the applicant and Transport Canada.

(B) Standards for the Conduct of Parachute Descents In or Into Controlled Airspace or an Air Route

- (1) No parachute descents shall be carried out unless authorized by the certificate holder or authorized by a person designated by the certificate holder;
- (2) Prior to authorizing any parachute descents, the certificate holder shall ensure the pilot-in-command of the jump aircraft and all persons making a parachute descent:
 - (a) have been made aware of the conditions of the certificate;
 - (b) have been made aware of their duties and responsibilities associated with the parachute descents; and
 - (c) are capable of carrying out any such duties and responsibilities;
- (3) A wind drift indicator drop or procedure shall be conducted within one hour prior to the commencement of any parachute descents;

Information Note: A wind drift indicator drop or procedure is required only where a parachute descent has not been conducted in the previous hour.

- (4) Parachute descents shall not be initiated without the permission of the pilot-in-command of the aircraft;
- (5) Parachute descents shall not be initiated where any part of the descent, including the freefall will be through clouds;

- (6) Parachute descents shall not be initiated where another aircraft in the area presents a hazard;
- (7) The aircraft shall be a minimum of 500 feet below and 2000 feet horizontally from cloud with a minimum flight visibility of 5 miles when dropping parachutists;
- (8) Parachute descents shall be initiated no lower than 2200 feet above ground level and no higher than the maximum altitude established for the operation;

Information Note: This information will be contained in the certificate.

- (9) Aircraft conducting parachute operations shall be equipped with a functioning two-way radio capable of communication with the air traffic control agency responsible for the airspace;

Information Note: This information will be contained in the certificate.

- (10) The pilot-in-command of the aircraft shall comply with all Air Traffic Control procedures established for the operations;

Information Note: This information will be contained in the certificate.

- (11) The parachute landing area shall be supervised by a Parachute Landing Area Supervisor who possesses a means of communicating with the pilot-in-command of the jump aircraft; and
- (12) Where the intended parachute landing area is within 1 kilometre of open water, all parachutists shall wear a personal flotation device capable of supporting the parachutist and his or her equipment.

(C) Parachute Descents In or Into Controlled Airspace or an Air Route at Night

- (1) The parachute landing area shall be illuminated in a manner that enables the pilot-in-command of the aircraft to clearly identify the landing area from the maximum altitude established for the parachute descents;
- (2) Parachute descents shall not be initiated unless the illuminated parachute landing area is clearly visible; and
- (3) Each parachutist shall be equipped with a steady or flashing light

visible through 360 degrees.

(D) Wind Limitations

Parachute descents shall not be initiated when wind speed measured at ground level at the intended parachute landing area is greater than:

- (a) 15 mph. for student parachutists;
- (b) 18 mph. for holders of CSPA Certificates of Proficiency (CoP) levels A and B or equivalent level of experience;
- (c) 25 mph. for holders of CSPA CoP levels C, D or E equivalent level of experience; or
- (d) 10 mph. for parachute descents at night, for all levels of experience.

Parachute Descents Over or Into a Built-up Area or Open-air Assembly of Persons

- 623.36** (b) This section contains the standards applicable to conducting parachute descents over or into a built-up area or open-air assembly of persons.

623.38 Issuance of a Special Flight Operations Certificate - Parachuting

(A) Application for Issuance of a Special Flight Operations Certificate

- (1) The following constitutes an application to conduct a parachute descent over or into a built-up area or an open-air assembly of persons:
 - (a) the name, address and where applicable, the telephone and facsimile numbers of the applicant;
 - (b) the dates and times of the proposed parachute descents;
 - (c) for information purposes, the make, model and registration of the parachute jump aircraft;

Information Note: It is not the intent of these standards to prevent an applicant from making substitutions for proposed aircraft that are not available.

- (d) declaration that the landowner(s) or tenants have granted permission for the proposed operation;
- (e) declaration that the governing municipality has been informed of the proposed operation and has no objection;
- (f) the number of persons exiting the aircraft on each jump run;
- (g) the requested altitude of the parachute descent above sea level;
- (h) the location of the proposed parachute landing area;

Information Note: This shall include the latitude/longitude, an accurate geographical description and where the parachute landing area is within a 20 nautical mile radius of a navigation aid, the bearing and distance from the navigation aid.

- (i) a scale diagram of the area 300 metres in all directions of the intended parachute landing area which shall include:
 - the type of terrain, ie. grass, asphalt;
 - the location of all hazards, obstructions, etc., and including height above the ground;
 - provisions for crowd control;
 - the location of the Parachute Landing Area Supervisor; and
 - the location and description of alternate landing sites;
 - (j) the name and qualifications of the Parachute Landing Area Supervisor;
 - (k) the method by which the parachute landing area supervisor shall communicate with the jump aircraft; and
 - (l) the names, addresses and telephone numbers of all parachutists participating in the descent, including proposed substitutes and evidence the parachutists meet the qualification requirements as outlined in paragraph (C) - Qualifications of Parachutists of these standards;
- (2) The application shall be received by the appropriate Regional Transport Canada General Aviation Office, a minimum of 10 working days prior to the date of the proposed parachute descent(s),

or by a date mutually agreed upon between the applicant and Transport Canada.

(B) Standards for the Conduct of Parachute Descents Over or Into Built-up Areas or Open-air Assembly of Persons

- (1) Only those persons identified in the certificate shall conduct a parachute descent;
- (2) Prior to any parachute descents being conducted, the certificate holder shall ensure the pilot-in-command of the jump aircraft and all persons making a parachute descent:
 - (a) have been made aware of the conditions of the certificate;
 - (b) have been made aware of their duties and responsibilities associated with the parachute descents; and
 - (c) are capable of carrying out any such duties and responsibilities;
- (3) A wind drift indicator drop or procedure shall be conducted within 15 minutes prior to the parachutists exiting the aircraft;
- (4) Parachute descents shall not be initiated without the permission of the pilot-in-command of the aircraft;
- (5) Parachute descents shall not be initiated where any part of the descent, including the freefall will be through clouds;
- (6) Parachute descents shall not be initiated where another aircraft in the area presents a hazard;
- (7) The aircraft shall be a minimum of 500 feet below and 2000 feet horizontally from cloud with a minimum flight visibility of 5 miles when dropping parachutists;
- (8) Parachute descents shall be initiated no lower than 2200 feet above ground level and no higher than the maximum altitude established for the operation;

Information Note: This information will be contained in the certificate.

- (9) Aircraft conducting parachute operations shall be equipped with a

functioning two-way radio capable of communication with the air traffic control agency responsible for the airspace;

Information Note: This information will be contained in the certificate.

- (10) The pilot-in-command of the aircraft shall comply with all Air Traffic Control procedures established for the operations;

Information Note: This information will be contained in the certificate;

- (11) Where the intended parachute landing area is within 1 kilometre of open water, all parachutists shall wear a personal flotation device capable of supporting the parachutist and his or her equipment;
- (12) Exit of parachutists over open-air assemblies of persons or in such a manner that in the event of a malfunction, a parachutist would land among an assembly of persons is prohibited; and
- (13) Under a fully functioning parachute canopy, parachutists may descend to an altitude no lower than 100 feet above an assembly of persons. This means 100 feet from the lowest part of any equipment a parachutist is carrying. (i.e. flags or smoke canisters).

(C) Qualifications of Parachutists

- (1) Each parachutist conducting a parachute descent over or into a built-up area an open air assembly of persons shall be in the possession of one of the following:
 - (a) a valid Canadian Sport Parachuting Association (CSPA) Exhibition Jump Rating (EJR);
 - (b) a valid United States Parachute Association PRO Rating; or
 - (c) a valid equivalent rating issued by a parachute organization other than the CSPA or USPA, that meets the standards set by the CSPA and has been approved in writing by Transport Canada.

Information Note: CSPA provides Transport Canada with an updated list of current holders of EJR Ratings on a regular basis. A parachutist who has completed the requirements for the issue of an EJR Rating but has not received it may provide Transport Canada with an interim notice issued by the CSPA that they had

completed the requirements for issue of the EJR and that it will be forthcoming.

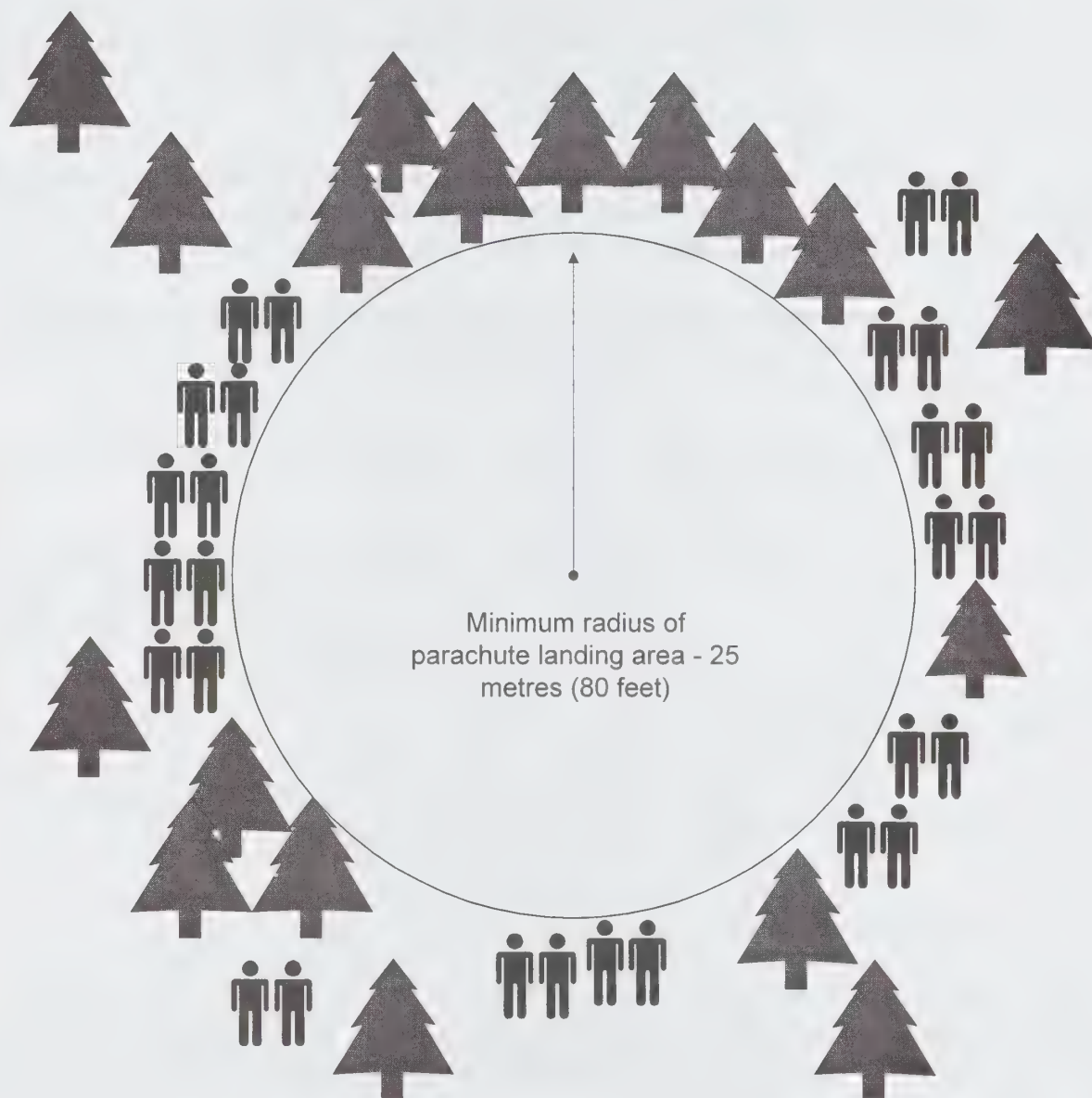
(D) Parachute Equipment

- (1) For the purpose of this section, an approved parachute means a parachute manufactured to the standards applicable to the Federal Aviation Administration (FAA), Technical Standard Order (TSO) C23 series.
- (2) Only parachute equipment that meets the following standards shall be used by parachutists conducting a parachute descent over or into a built-up area or over or into an open-air assembly of persons:
 - (a) Each parachutist shall wear a single harness dual parachute pack, having at least one main parachute and one approved reserve parachute.
 - (b) Both the main and reserve parachutes shall be "Ram-Air" type canopies.
 - (c) The main canopy used by a parachutist shall be meet the performance characteristics and wing loading of the parachute on which he or she qualified for their CSPA Exhibition Jump Rating or USPA Pro Rating.

(E) Parachute Packing Requirements

- (1) For the purpose of this section a certificated parachute rigger means a person who holds a valid certificate issued by:
 - (a) The Canadian Sport Parachuting Association; or
 - (b) The Federal Aviation Administration (FAA).
- (2) Parachutes used to conduct a parachute descent over or into a built-up area or an open-air assembly of persons shall be packed as follows:
 - (a) The main parachute canopy shall be packed by the person making the parachute descent, or a certificated parachute rigger, within 120 days prior to the date of the parachute descent; and

Minimum Dimensions of a Parachute Landing Area - for Unrestricted Wind Direction



The Parachute Landing Area indicated above may be used for parachute descents with the wind in any direction .

Parachute #1

- (b) The reserve parachute canopy shall be packed by a certificated and appropriately rated parachute rigger within 120 days of the parachute descent.

(F) Parachute Landing Area

- (1) The parachute landing area into which parachutists land when conducting a parachute descent over or into a built-up area or an open-air assembly persons shall:
 - (a)
 - (i) for all wind directions be a level area, clear of obstacles with a minimum average radius of 25 metres (80 feet); (see Diagram Parachute #1) or
 - (ii) be a level rectangular area, clear of obstacles with minimum dimensions of 40 metres long and 25 metres wide where the longer side of the rectangle is positioned into wind; (see Diagram Parachute #2) and
 - (b) be clear of any buildings or any other obstructions bordering the perimeter of the landing zone that lie in a plane of 45 degrees extending outwards from the centre of the landing zone chosen which obstruct the planned final approach path to the landing zone; (see Diagram Parachute #3)
 - (c) have adequate crowd control measures in place to ensure spectators do not enter the landing zone;
 - (d) have a suitable alternate landing site, in the event of an undershoot or overshoot. The location of the alternate site must be identified on the diagram submitted with the application for the parachute descent; and
 - (e) be supervised by a parachutist that holds a CSPA Class "B" Certificate of Proficiency (CoP) or equivalent level of experience or by a person who has acted as a qualified judge in parachuting competitions and the supervisor possesses a means of communicating with the pilot-in-command of the jump aircraft.

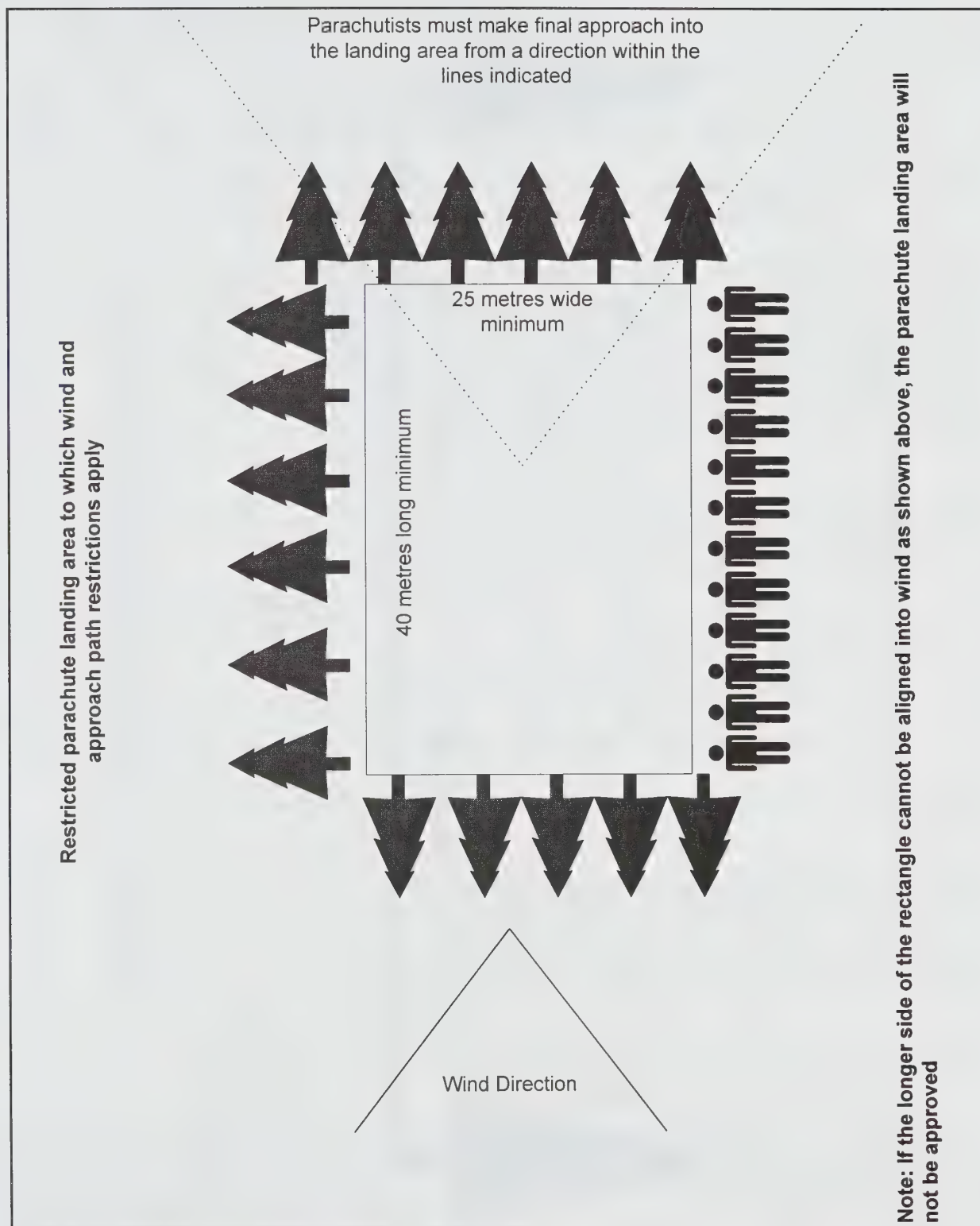
Information Note: Paragraph 1(e) of this section does not apply to parachute descents taking place at Special Aviation Events where the participants of the parachute descent and the aircraft are under

the direct control of the Director of Flight Operations.

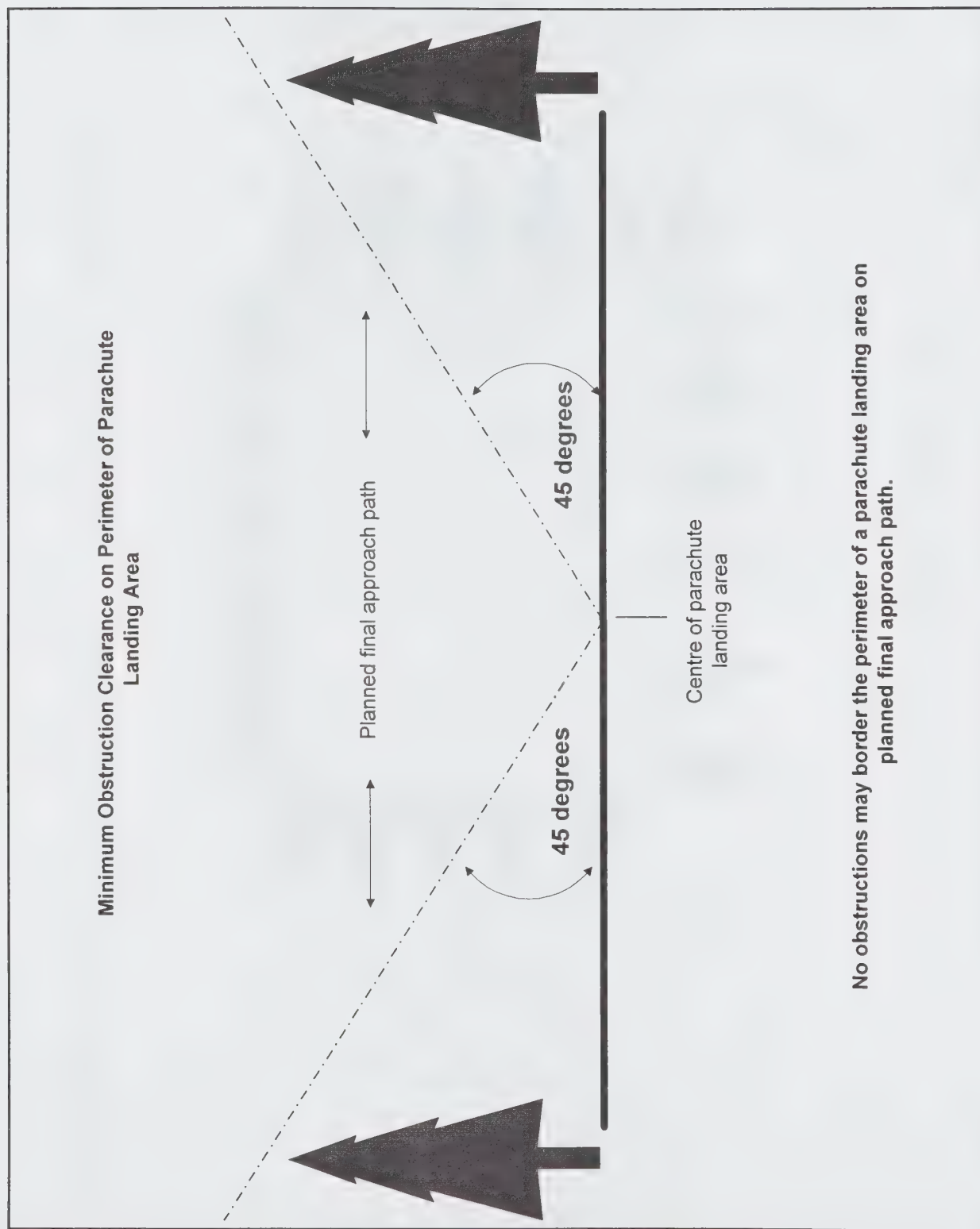
- (2) A parachute landing area into which parachutists land when conducting a parachute descent over or into a built-up area or an open-air assembly persons at night shall be illuminated in a manner that enables the pilot-in-command of the aircraft to clearly identify the landing area from the maximum altitude established for the parachute descents;
- (3) Parachute descents at night shall not be initiated unless:
 - (a) the illuminated parachute landing area is clearly visible; and
 - (b) each parachutist is equipped with a steady or flashing light visible through 360 degrees.

(G) Wind Limitations

Parachute descents shall not be initiated in winds speeds measured at ground level at the intended parachute landing area above 18 MPH.



Parachute #2



Parachute #3

Division IV

Miscellaneous Special Flight Operations

623.65 (a) Take-offs, Approaches and Landings Within Built-up Areas

The following standards apply to the application for and the conduct of a flight operation in accordance with CAR 602.13(1):

- (1) An application for a Special Flight Operations Certificate for the purpose of take-offs, approaches or landings within the built-up areas of cities or towns in accordance with CAR 602.13(1) shall be received by the appropriate Regional Transport Canada General Aviation Office, at least 10 working days prior to the date of the proposed operation, or by a date mutually agreed upon between the applicant and Transport Canada.
- (2) The following constitutes an application for a Special Flight Operations Certificate for the purpose of take-offs, approaches or landings within the built-up areas of cities or towns in accordance with CAR 602.13(1):
 - (a) the name, address, and where applicable, the telephone number and facsimile number of applicant;
 - (b) the location of the area to be used for take-off or landing;
 - (c) the dates, alternate dates and times of the proposed operation;
 - (d) a clear, legible presentation of the area to be used for the take-off or landing. This presentation may be in the form of a scale diagram, aerial photograph or large scale topographical chart and must include at least the following information:
 - (i) the location and size of the area to be used for the take-off or landing;
 - (ii) the location and height above ground of all obstacles in the approach and departure path to the site;

- (iii) the position and type of security control (eg. fences) to be used to ensure the area will be kept clear of persons during any take-offs or landings;
 - (iv) the location of any refuelling area;
 - (v) the location and type of wind indicator;
 - (vi) the altitudes and routes to be used on approach and departure to and from the site;
- (e) the purpose of the operation;
 - (f) the type(s) and registration(s) of all aircraft using the site;
 - (g) certification that the landowner has granted his or her permission for the proposed operation;
 - (h) certification that the governing municipality has been informed of the proposed operation and has no objection;
 - (i) the procedures and precautions to be taken to ensure no hazard is created to persons or property on the surface;
 - (j) the name, address, and where applicable, the telephone and facsimile numbers of the person designated to be responsible for supervision of the site (Ground Supervisor) during the operation; and
 - (k) the method by which the Ground Supervisor shall communicate with the pilot-in-command of aircraft using the site.

Take-off and Landing Areas

The following standards apply to areas to be used for take-offs and landings in built-up areas of cities or towns:

- (1) For aircraft other than balloons and helicopters, the applicant shall submit documentation that the site chosen is suitable for the proposed aircraft type.

-
- (2) For helicopters, the take-off/landing area shall meet the following standards:
- (a) the take-off/landing area shall be a minimum of 1.5 times the overall length of the largest helicopter proposed to use the site;
 - (b) the touchdown area shall be clearly marked;
 - (c) except for helicopter operations taking place at a Canadian Special Aviation Event, a safety area of a minimum of 200 feet around the take-off/landing area shall be maintained clear of obstacles and persons not required for the operation;
 - (d) in areas where an assembly of persons congregate to observe the operation, the safety area shall be fenced and sufficient trained ground personnel shall be present to ensure security of the area;
 - (e) for helicopter operations at a Canadian Special Aviation Event, the operation is conducted in accordance with the standards contained in section 623.07 - Division I, Special Aviation Events of these standards.
- (3) Approach and departure paths to the take-off/landing areas shall be in accordance with the standards published for normal airport certification.

623.65 (b) and (c) Minimum Altitudes and Distances

- (1) The following standards apply to the application for and the operation of an aircraft for the purpose of conducting aerial application, aerial inspection, aerial photography or helicopter class B, C, or D external load operations at altitudes and distances less than those set out in CAR 602.14(2)(a) and CAR(16)(2).
- (2) An application shall be received by the appropriate Regional Transport Canada General Aviation Office, at least 10 working days prior to the date of the proposed operation, or by a date mutually agreed upon between the applicant and Transport Canada.
- (3) The following constitutes an application for a Special Flight Operations Certificate for the purpose of operations in paragraph (1) above:

- (a) the name, address, and where applicable, the telephone number and facsimile number of the applicant;
- (b) the name, address, and where applicable the telephone number and facsimile number of the person designated by the applicant to have operational control over the operation (Operation Manager);
- (c) method by which the Operation Manager may be contacted directly during operation by those involved in the operation;
- (d) the type and purpose of the operation;
- (e) the dates, alternate dates and times of the proposed operation;
- (f) certification that the landowner(s) has/have granted their permission for the proposed operation;
- (g) certification that the governing municipality has been informed of the proposed operation and has no objection;
- (h) the type(s) and registration(s) of all aircraft involved in the operation;
- (i) the names and pilot licence numbers of all the pilots involved in the operation;
- (j) for proposed pilots that hold licences not issued by the Minister, copies of their licences and medical certificates;
- (k) the security plan for the area(s) of operation and security plan for the area(s) to be overflown to ensure no hazard is created to persons or property on the surface;
- (l) the emergency contingency plan to deal with any disaster resulting from the operation;
- (m) the name, address, and where applicable the telephone and facsimile numbers of the person designated to be responsible for supervision of the operation area (Ground Supervisor), if different from the Operation Manager during the operation;

- (n) the method by which the Ground Supervisor shall communicate with the pilot-in-command of aircraft participating in the operation;
- (o) a clear, legible presentation of the area to be used during the operation. The presentation may be in the form of a scale diagram, aerial photograph or large scale topographical chart and must include at least the following information:
 - (i) the altitudes and routes to be used on the approach and departure to and from the area where the operation will be carried out;
 - (ii) the location and height above ground of all obstacles in the approach and departure path to the areas where the operation will be carried out;
 - (iii) the exact boundaries of the area where the actual operation will be carried out;
 - (iv) the altitudes and routes to be used while carrying out the operation; and
- (q) any other information required by the Minister to ensure the operation may be carried out in a safe manner.

**623.65(d) Unmanned Air Vehicle
(amended 2003/12/01)**

- (1) The following standards apply to the application for and the operation of an unmanned aeroplane, rotorcraft or airship pursuant to CAR 602.41.
- (2) An application for a Special Flight Operations Certificate for the purpose of conducting the flight of an unmanned aircraft other than an unmanned free balloon or a model aircraft shall be received by the appropriate Regional Transport Canada General Aviation Office, at least 20 working days prior to the date of the proposed operation or by a date mutually agreed upon between the applicant and Transport Canada.
- (3) The following constitutes an application for a Special Flight Operations Certificate for the purpose of operations in paragraph (1) above:
 - (a) the name, address, and where applicable, the telephone number and facsimile number of the applicant;
 - (b) the name, address, and where applicable the telephone number and facsimile number of the person designated by the applicant to have operational control over the operation (Operation Manager);
 - (c) method by which the Operation Manager may be contacted directly during operation;
 - (d) the type and purpose of the operation;
 - (e) the dates, alternate dates and times of the proposed operation;

(f) a complete description, including all pertinent flight data on the aircraft to be flown;

(g) the security plan for the area(s) of operation and security plan for the area(s) to be overflown to ensure no hazard is created to persons or property on the surface;

(h) the emergency contingency plan to deal with any disaster resulting from the operation;

(i) the name, address, telephone and facsimile numbers of the person designated to be responsible for supervision of the operation area (Ground Supervisor), if different from the Operation Manager during the operation;

(j) a detailed plan describing how the operation shall be carried out. The plan shall include a clear, legible presentation of the area to be used during the operation. The presentation may be in the form of a scale diagram, aerial photograph or large scale topographical chart and must include at least the following information:

(i) the altitudes and routes to be used on the approach and departure to and from the area where the operation will be carried out;

- (ii) the location and height above ground of all obstacles in the approach and departure path to the areas where the operation will be carried out;
- (iii) the exact boundaries of the area where the actual operation will be carried out;
- (iv) the altitudes and routes to be used while carrying out the operation;
- (k) any other information pertinent to the safe conduct of the operation requested by the Minister.

623.65 (e) Entering or leaving an aircraft in flight

- (1) The following standards apply to the application for and the operation of aircraft pursuant to CAR 602.25(b).
- (2) An application for a Special Flight Operations Certificate for the purpose of operating a powered aircraft while persons enter, or except for parachute descents, leave powered aircraft in flight shall be received by the appropriate Regional Transport Canada General Aviation Office, at least 10 working days prior to the date of the proposed operation or by a date mutually agreed upon between the applicant and Transport Canada.
- (3) The following constitutes an application for a Special Flight Operations Certificate for the purpose of operations in paragraph (2) above:
 - (a) the name, address, and where applicable, the telephone number and facsimile number of the applicant;
 - (b) the name, address, and where applicable the telephone number and facsimile number of the person designated by the applicant to have operational control over the operation (Operation Manager);
 - (c) method by which the Operation Manager may be contacted directly while the operation is taking place;
 - (d) a description and purpose of the operation;

- (e) the dates, alternate dates and times of the proposed operation;
- (f) certification that the governing municipality has been informed of the proposed operation and has no objection;
- (g) the type(s) and registration(s) of all aircraft involved in the operation;
- (h) the names and pilot licence numbers of all the pilots involved in the operation;
- (i) for proposed pilots that hold licences not issued by the Minister, copies of their licences and medical certifications;
- (j) the security plan for the area(s) of operation and security plan for the area(s) to be overflown to ensure no hazard is created to persons or property on the surface;
- (k) a detailed plan describing how the operation will be carried out including a clear, legible presentation of the area to be used during the operation. The presentation may be in the form of a scale diagram, aerial photograph or large scale topographical chart and must include a minimum of the following information:
 - (i) the altitudes and routes to be used on the approach and departure to and from the area(s) where the operation will be carried out;
 - (ii) the location and height above ground of all obstacles in the approach and departure path to the area(s) where the operation will be carried out;
 - (iii) the exact boundaries of the area(s) where the actual operation will be carried out;
 - (iv) the altitudes and routes to be used while carrying out the operation;
- (m) any other information pertinent to the safe conduct of the operation requested by the Minister.

623.65 (f)(i) The operation of an aircraft while conducting aerobatic manoeuvres in or into controlled airspace or an air route

- (1) The following standards apply to the application for and the operation of an aircraft while conducting aerobatic manoeuvres in or into controlled airspace or an air route pursuant to CAR 602.27(b).
- (2) An application for a Special Flight Operations Certificate for the purpose of conducting aerobatic manoeuvres in or into controlled airspace or an air route shall be received by the appropriate Regional Transport Canada General Aviation Office, at least 10 working days prior to the date of the proposed operation, or by a date mutually agreed upon between the applicant and Transport Canada.
- (3) The following constitutes an application for a Special Flight Operations Certificate for the purpose of operations in paragraph (1) above:
 - (a) the name, address, and where applicable, the telephone number and facsimile number of the applicant;
 - (b) the location and dimensions of the airspace requested; and
 - (c) the dates and times the use of the airspace is requested.

623.65 (f)(ii) The operation of an aircraft while conducting aerobatic manoeuvres below 2000 feet AGL

- (1) The following standards apply to the application for and the operation of an aircraft while conducting aerobatic manoeuvres below 2000 feet AGL pursuant to CAR 602.27(d).

Information Note: These requirements do not apply to persons authorized to conduct aerobatic manoeuvres in a Special Aviation Event pursuant to CAR 603.02.

- (2) An application for a Special Flight Operations Certificate for the purpose of conducting aerobatic manoeuvres below 2000 feet AGL shall be received by the appropriate Regional Transport Canada General Aviation Office, at least 10 working days prior to the date of the proposed operation, or by a date mutually agreed upon between the applicant and Transport Canada.

- (3) The following constitutes an application for a Special Flight Operations Certificate for the purpose of operations in paragraph (1) above:
- (a) the name, address, and where applicable, the telephone number and facsimile number of the applicant;
 - (b) the location and dimensions of the airspace requested;
 - (c) the dates and times the use of the airspace is requested;
 - (d) where the operation is to take place at an airport or aerodrome, evidence that the airport manager or aerodrome operator has been made aware of the proposed operation and has no objection; or
 - (e) where the operation is to take place over private property, evidence that the landowners have been made aware of the proposed operation and have no objection.

Information Note: Applicants must be cognizant of the Ministerial Public Interest responsibilities pertaining to noise in selecting a site to carry out low level aerobatics. Sites that are located in the vicinity of noise sensitive areas such as residential areas, livestock areas, etc. may not be authorized. The onus is on the applicant to provide adequate information with the application for this determination to be reached.



CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 624 - PRIVATE OPERATOR PASSENGER TRANSPORTATION

Canada

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NOTE

All amendments to the CARs will be indicated by the Coming into Force date, immediately following the amended text.

RECORD OF AMENDMENTS

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624 - PRIVATE OPERATOR PASSENGER TRANSPORTATION

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PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 624 - PRIVATE OPERATOR PASSENGER TRANSPORTATION

(amended 2005/11/15)

DIVISION II - FLIGHT OPERATIONS AND TRAINING

624.22 *No Alternate Aerodrome - IFR Flight*

Pursuant to section 604.22 of the *Canadian Aviation Regulations* (CARs), the requirements for an authorization to conduct an IFR flight where an alternate aerodrome has not been designated in the IFR flight plan or IFR flight itinerary are as follows:

Areas of Operations

- (a) the take-off aerodrome is situated within the North American continent, Bermuda or the Caribbean islands;
- (b) the destination aerodrome is situated within Canada, the continental United States of America (USA) or Puerto Rico;

Weather Requirements

- (c) where the destination of the flight is in Canada, from two (2) hours before until two (2) hours after the estimated time of arrival (ETA), at the aerodrome of intended landing, there is, in respect to that aerodrome:
 - (i) no risk of fog or other restriction to visibility, including precipitation, forecast or reported, below three (3) miles,
 - (ii) no risk of thunderstorms, isolated or otherwise, forecast or reported,
 - (iii) a forecast ceiling of at least 1,000 feet above the final approach fix (FAF) altitude and a visibility of at least three (3) miles or a ceiling of at least 1,500 feet above the minimum descent altitude (MDA) and a visibility of at least six (6) miles, and
 - (iv) no risk of freezing rain, freezing drizzle, or sleet forecast or reported;
- (d) where the destination of the flight is in continental USA or Puerto Rico, from one (1) hour before until one (1) hour after ETA, at the aerodrome of intended landing, there is, in respect to that aerodrome:
 - (i) no risk of fog or other restriction to visibility, including precipitation, forecast or reported, below three (3) miles,

- (ii) no risk of thunderstorms, isolated or otherwise, forecast or reported,
 - (iii) a forecast ceiling of at least 1,000 feet above the FAF altitude and a visibility of at least three (3) miles or a ceiling of at least 1,500 feet above the MDA and a visibility of at least six (6) miles, and
 - (iv) no risk of freezing rain, freezing drizzle, or sleet forecast or reported;
- (e) the flight crew regularly monitor destination and suitable alternative destination weather during flight;

Aerodrome of Intended Landing Requirements

- (f) the aerodrome of intended landing is:
- (i) equipped with at least two (2) separate runways, each of which is operational and suitable for a safe landing for the aeroplane type, taking into consideration the approved operational limitations, and

Information Note:

The reciprocal of one runway is not acceptable as the second runway.

- (ii) equipped with emergency or standby electrical power supply in support of the main electrical power supply used to operate all equipment and facilities that are essential to the safe landing of the aeroplane, whether such landing be by day or by night;

Fuel Requirements

- (g) the aeroplane carries, at take-off, the fuel required to meet the requirements of section 602.88 and paragraph 604.22(c) of the CARs as the case may be; and

Aerodrome Familiarization

- (h) each flight crew member is thoroughly familiar with all suitable diversionary airports which are available during the flight.

624.23 Take-off Minima

(1) Weather Below Landing Limits

Pursuant to section 604.23 of the CARs, the requirements for an authorization to take off in instrument meteorological conditions (IMC) when weather conditions are above take-off minima, but below the landing minima, specified for the runway in use in the *Canada Air Pilot* or an equivalent foreign publication are as follows:

- (a) an alternate aerodrome is specified in the IFR flight plan; and
- (b) the alternate aerodrome referred to in paragraph (a) is located:
 - (i) in the case of a twin-engined aeroplane, within the distance that can be flown in 60 minutes at the normal cruising speed, or

- (ii) in the case of an aeroplane with three or more engines, within the distance that can be flown in 120 minutes at the normal cruising speed.

(2) Weather Below Published Take-off Minima

Pursuant to section 604.23 of the CARs, the requirements for an authorization to take off in IMC when weather conditions are below take-off and landing minima specified for the runway in use in the *Canada Air Pilot* or an equivalent foreign publication are as follows:

(a) Take-off Minima - Reported Visibility - RVR 1,200 feet or 1/4 SM Visibility

- (i) a take-off alternate aerodrome is selected in accordance with paragraphs (1)(a) and (b),
- (ii) for each airport to which the authorization applies, the private operator and the pilot-in-command have determined the significant obstructions which exist in the take-off path and have determined, by the use of the approved aeroplane performance charts, that the aeroplane will safely clear obstructions on the take-off path and maintain at least the minimum en route altitude to the take-off alternate, with the critical engine inoperative,
- (iii) the operations manual contains detailed guidance on how to determine departure one engine inoperative climb gradient and obstacle clearance,
- (iv) the runway to be used is equipped as specified in the *Aerodrome Standards and Recommended Practices* (TP 312) document with serviceable and functioning high intensity runway lights, runway centre line lights, or runway centre line markings that are plainly visible to the pilot throughout the take-off run,
- (v) the pilot-in-command is satisfied that the required runway visual range (RVR) 1,200 feet or 1/4 SM visibility exists for the runway to be used before commencing take-off,
- (vi) the pilot-in-command and second-in-command attitude indicators on the aeroplane incorporate pitch attitude index lines in appropriate increments above and below the reference line to at least 15 degrees, and provide a ready depiction of total aeroplane attitude. The approved Failure Warning Systems which will immediately detect essential instrument and equipment failures or malfunctions is operative,

Information Note:

For the purpose of reduced visibility take-offs, essential instruments are defined as attitude indicators, directional gyros and HSI's.

- (vii) the chief pilot has certified in the training and qualification records that the pilot-in-command, and if authorized by the operator for take-off at lower than normal limits, the second-in-command, are competent to conduct an RVR 1,200 feet take-off or a 1/4 SM take-off; and

(b) Take-off Minima - Reported Visibility - RVR 600 feet

- (i) a take-off alternate aerodrome is selected in accordance with paragraphs (1)(a) and (b),
- (ii) for each airport to which the authorization applies, the private operator and the pilot-in-command have determined the significant obstructions which exist in the take-off path and have determined, by the use of the approved aeroplane performance charts, that the aeroplane will safely clear obstructions on the take-off path and maintain at least the minimum en route altitude to the take-off alternate, with the critical engine inoperative,
- (iii) the operations manual contains detailed guidance on how to determine departure one engine inoperative climb gradient and obstacle clearance,
- (iv) the runway to be used has the following equipment as specified in the *Aerodrome Standards and Recommended Practices* (TP 312) document:
 - (A) serviceable and functioning high intensity runway lights, runway centre line lights and centre line markings that are plainly visible to the pilot throughout the take-off run,
 - (B) at least two transmissometers, one located adjacent to the runway threshold and one adjacent to the runway mid-point, each reading not less than RVR 600 feet, and
 - (C) if three transmissometers are available and the mid-point transmissometer is unserviceable, take-off is authorized provided the transmissometer adjacent to the runway threshold and the one adjacent to the departure end of the runway, is reading not less than RVR 600 feet,
- (v) the pilot-in-command is satisfied that the required RVR 600 feet visibility exists for the runway to be used before commencing take-off,
- (vi) the pilot-in-command and second-in-command attitude indicators (artificial horizons) on the aeroplane incorporate pitch attitude index lines in appropriate increments above and below the zero pitch reference line to at least 15 degrees, and provide a ready depiction of total aeroplane attitude. The approved Failure Warning Systems which will immediately detect essential instrument and equipment failure or malfunctions is operative,

Information Note:

For the purpose of reduced visibility take-offs, essential instruments are defined as attitude indicators, directional gyros and HSI's.

- (vii) the pilot-in-command, and the second-in-command if authorized by the private operators for lower than normal take-off limits, have been checked within the preceding 24 months in an approved simulator by the chief pilot and have been certified as competent to use these minima in the training and qualification records, and

(viii) the chief pilot has certified in the training and qualification records, that the pilot-in-command (and the second-in-command, if so authorized by the private operator) has conducted 600 RVR training in an approved simulator within the preceding 12 months and is considered competent to conduct a 600 RVR take-off.

624.25 Navigation System

(1) Minimum Performance Capability for Long Range Area Navigation System

For conducting long range area navigation, the navigation system shall:

- (a) have a standard deviation of lateral track deviations of less than 6.3 nautical miles;
- (b) have a proportion of the total flight time spent by the aircraft 30 nautical miles or more from the cleared track of less than 5.3×10^{-4} ;
- (c) have a proportion of the total flight time spent by the aircraft at or between 50 and 70 nautical miles from the cleared track of less than 1.3×10^{-4} ; and
- (d) where the navigation system consists exclusively of one or more GPS to meet the long range navigation requirements specified in paragraphs (2)(c) and (d), meet the requirements of FAA Document No. 8110.60, titled: *GPS as a Primary Means of Navigation in Oceanic/Remote Operations*.

(2) Required Navigation Performance Capability (RNP) Airspace

The following are the requirements to operate in Required Navigation Performance Capability (RNP) airspace, to flight plan published high level fixed area navigation (RNAV) routes in RNP airspace, and to be accommodated by Air Traffic Control (ATC) on other routes using RNP separation criteria:

- (a) the aeroplane is equipped with at least two independent navigation systems, one of which being a long range area navigation system; and
- (b) the flight crew has received training on the operation of the long range area navigation system in accordance with the requirements specified in subsection 624.26(1) of the CARs.

(3) Canadian Minimum Navigation Performance Specification (CMNPS) and RNP Airspace

The following are the requirements to operate in Canadian Minimum Navigation Performance Specification (CMNPS) airspace, to flight plan published high level fixed RNAV routes in RNP airspace, and to be accommodated by ATC on other routes using RNP separation criteria:

- (a) the aeroplane's navigation system:
 - (i) for use only in domestic airspace on high level airways, is in compliance with paragraph 605.18(j) of the CARs,
 - (ii) for use only in domestic airspace on company approved routes or direct routes that begin and end within reception range of ground based navaids, includes at least two

independent navigation systems, one of which being a long range area navigation system, or

(iii) for use in CMNPS airspace other than on high level airways, company approved routes and direct routes that begin and end within the reception range of ground based nav aids, includes two independent long range navigation systems; and

(b) the flight crew has received training on operation of the long range area navigation systems in accordance with training requirements set out in subsection 624.26(1) of the CARs.

(4) North Atlantic Minimum Navigation Performance Specification (NAT MNPS), CMNPS and RNP Airspace

The following are the requirements to operate in North Atlantic Minimum Navigation Performance Specification (NAT MNPS) airspace and CMNPS airspace, to flight plan published high level fixed RNAV routes in RNP airspace, and to be accommodated by ATC on other routes using RNP separation criteria:

(a) the aeroplane is equipped with at least two independent long range area navigation systems, except that

(i) where the aeroplane is equipped with at least two independent navigation systems, one of which being a long range area navigation system, the aeroplane may be approved for NAT MNPS operations restricted to routes approved for aeroplanes with one long range RNAV system, and

(ii) where the aeroplane is equipped with at least two independent navigation systems based on short range ground transmitters, the aeroplane may be approved for NAT MNPS operations restricted to routes approved for aircraft with no long range RNAV capability; and

(b) the flight crew has received training on operation of long range area navigation systems in accordance with training requirements set out in subsection 624.26(1) of the CARs.

(5) Reduced Vertical Separation Minima (RVSM) in NAT MNPS, CMNPS and RNP Airspace

The following are the requirements to operate in NAT MNPS Reduced Vertical Separation Minima (RVSM) airspace and CMNPS airspace, to flight plan published high level fixed RNAV routes in RNP airspace, and to be accommodated by ATC on other routes using RNP separation criteria:

(a) the private operator complies with and the aircraft is certified in accordance with the *Minimum Aircraft System Performance Specifications (MASPS)* and other requirements of *ICAO NAT DOC 002* and *ICAO/FAA Document 91-RVSM*; and

(b) the flight crew has received training in equipment monitoring requirements and flight procedures in accordance with subsection 624.26(7) of the CARs.

Information Note:

For this authorization, the authority for NAT MNPS operation is not dependent on RVSM capability. If the aircraft is not certified for RVSM or is being operated in accordance with an MEL for an unserviceable equipment item required for RVSM, the aircraft may still be operated in the NAT MNPS airspace at a flight level that does not require that capability.

(6) Pacific Required Navigation Performance 10 (RNP-10) Airspace

The following are the requirements to operate in Pacific RNP-10 airspace:

- (a) an aircraft is equipped with at least two independent long range navigation systems capable of meeting a position accuracy of ± 10 NM or better for 95% of the flight time in RNP-10 airspace;
- (b) an RNP-10 time limit has been established if the aircraft is equipped with only Inertial Navigation Systems (INS) or Inertial Navigation Units (INU), in order to meet the Pacific RNP-10 accuracy requirements;
- (c) the aircraft meets the technical requirements of the navigation element of *FAA Order 8400.12A, Required Navigation Performance 10 (RNP-10) Operational Approval*;
- (d) the flight crew has received training on:
 - (i) the operation of the long range area navigation systems in accordance with the training requirements set out in subsection 624.26(5) of the CARs, and
 - (ii) the operations in Pacific RNP-10 airspace in accordance with the training requirements set out in subsection 624.26(6) of the CARs.

(7) Instrument Approaches - Global Positioning System (GPS)

(a) The following are the requirements for a private operator to fly instrument approach procedures using only GPS navigation information:

- (i) an operational evaluation has been completed in accordance with paragraph (b) by the Minister on each aircraft type/GPS/FMS model installation for which approach authorization is sought,
- (ii) the private operator has an approved flight crew training and qualifications program for use of the GPS/FMS system that meets the requirements of section 624.26 of the CARs, and
- (iii) the private operator has amended the operator's standard operating procedures to reflect GPS approach operations and has the amended procedures approved by the Association, where required;

(b) The following items are assessed in the operational evaluation referred to in paragraph (a) prior to the approval of the private operator's GPS approach standard operating procedures, where applicable, and training program:

Information Note:

Identical installations of the same model of GPS in the same type of aircraft with the same operator do not need separate evaluations.

(i) Database

The geographical coverage area for the database is compatible with the type of operations conducted by the company. The private operator has procedures in place to ensure that the database will be updated in accordance with the appropriate data revision cycle. This includes a contract with a database supplier and the inclusion, in the appropriate company manuals, of the person responsible for installing the updates in the aircraft. The private operator has a procedure in place for pilots to report database errors and for information on database errors to be passed on to other company pilots, the avionics manufacturer and the Association.

(ii) Unit Installation and Operation

The handling and procedures associated with the GPS avionics are such that all operations required for GPS approach can be accomplished without an adverse impact on normal crew duties and responsibilities. GPS related tasks do not consume the attention of the pilot not flying (PNF) during critical phases of flight, that is between the time the aircraft turns inbound on the final approach course and the time the aircraft is established in the climb configuration on a missed approach.

(iii) Control Display Unit (CDU) and Course Deviation Indicator (CDI) / Distance Display

If the GPS/FMS control unit is not adequately accessible from each pilot position, or if GPS course deviation and distance displays are not within the primary field of view at both pilot stations, the private operator has designated in the standard operating procedures the position that the pilot flying (PF) and pilot not flying (PNF) are required to occupy during GPS approach for that type of installation. Each aircraft type that is certified for operation by two crew members has GPS course deviation and distance displays at each pilot station. An operation specification authorizing GPS approaches is not issued unless the PNF has a means acceptable, in the Minister's opinion, of monitoring the PF during an approach.

(iv) Distance Display on the HSI

In the case of installations where GPS guidance information (course tracking, To/From and NAV flags) are switched onto the HSI for display, but the DME distance information is not switched out (i.e. DME distance rather than GPS distance is displayed continuously on the HSI even when GPS source is selected to HSI), the private operator indicates, in its standard operating procedures for GPS approach, the need to deselect other NAV/DME sources in order to eliminate distance displays in the pilot's primary field of vision not related to the approach procedure being flown.

(v) Annunciation

The private operator ensures that responses to system annunciation (including Receiver Autonomous Integrity Monitoring (RAIM) warnings), the means of selecting GPS track information to the CDI/HSI and the means of coupling GPS steering information to the aircraft automatic flight control system are compatible with the safe operation of the aircraft type and category. The operator's standard operating procedures specifies the procedure whereby the control unit is programmed, approach waypoints are verified against an independent source, approach mode is armed, and cockpit NAV source and AFC guidance source switches are selected and verified. Any switch selection or programming errors that the Minister believes are likely to occur and that could lead to a serious incident are, if possible, identified and addressed in the private operator's training program and standard operating procedures, otherwise, the installation for approach use is not approved.

(vi) Airborne Evaluation

The Minister observes the pre-flight and in-flight operation of the unit on at least one GPS approach and missed approach. If the PF is allowed to occupy either seat during GPS approaches, then one approach from each pilot position has to be demonstrated. An airborne evaluation in an aircraft is placed under VFR. Emphasis is put on crew co-ordination, pilot workload (PF and PNF), and switch selections.

624.26 Training Program**(1) Required Navigation Performance Capability (RNP) Airspace, Canadian Minimum Navigation Performance Specification (CMNPS) Airspace and North Atlantic Minimum Navigation Performance Specification (NAT MNPS)**

To qualify for an authorization to conduct operations in Required Navigation Performance Capability (RNP) Airspace, Canadian Minimum Navigation Performance Specification (CMNPS) Airspace and North Atlantic Minimum Navigation Performance Specification (NAT MNPS) Airspace, the private operator shall ensure that each flight crew member has completed training in the following areas:

- (a) the normal operating procedures, including navigation system pre-flight data entry and periodic cross-checking of system position display against aeroplane position;
- (b) the method of monitoring and cross-checking the system that is coupled to the auto-pilot;
- (c) the action in the event of discrepancy between systems, method of determining which is the most accurate or reliable system;
- (d) the contingency procedures applicable to the selected airspace;
- (e) the action to be taken in the event of single or multiple systems failure;
- (f) the procedure for manually updating systems;

- (g) the airborne emergency procedures, including re-alignment if applicable;
- (h) the procedure for regaining track after deliberate or accidental deviation from the cleared track; and
- (i) area navigation systems (RNAV), in accordance with the training requirements set out in subsection (5).

(2) Category II/III Operations

Category II Operations

To qualify for an authorization to conduct Category II operations, a private operator shall ensure that each flight crew member has completed training on the standards for the conduct of Category II operations that are contained in the *Manual of All Weather Operations (Category II)* (TP 1490).

(3) Lower than Standard Take-off Weather Minima (RVR 1,200 feet - 1/4 SM and RVR 600 feet) for Pilots

Subject to paragraph (c), to qualify for an authorization to conduct take-offs in lower than the standard take-off weather minima (RVR 1,200 feet - 1/4 SM and RVR 600 feet), a private operator shall ensure that each flight crew member has completed

- (a) Ground Training covering:
 - (i) take-off alternate requirements,
 - (ii) knowledge of minimum experience required by the pilot-in-command,
 - (iii) pilot-in-command responsibility for visibility and obstacle clearance requirements, and
 - (iv) minimum aeroplane and runway equipment requirements;
- (b) Flight Simulator Training for RVR 600 feet take-offs only, including the performance of:
 - (i) one completed take-off at RVR 600 feet, and
 - (ii) one rejected take-off at RVR 600 feet with an engine failure;
- (c) The training specified in paragraphs (a) and (b) is provided to the pilot-in-command, and if the operations manual indicates that the second-in-command may conduct take-offs in weather conditions below the take-off minima specified in the instrument approach procedure, the second-in-command.

(4) Instrument Approaches - Global Positioning System (GPS)**(a) General Training**

- (i) To qualify for an authorization to conduct GPS approaches in IFR, a private operator shall have a flight crew training program. Each flight crew member shall have completed the appropriate training prior to conducting GPS approaches.
- (ii) Where a flight crew member is required to use more than one type of GPS for approach, the private operator shall ensure the training program addresses the differences between the units.
- (iii) The private operator shall ensure the ground training includes “hands on” training using a desk top simulator, a computer based simulation of the unit to be used, or a static in-aircraft unit.

(b) Ground Training - Non-integrated Receivers (Panel Mount GPS Receivers)

The private operator shall ensure that the training program candidates are trained to proficiency in each of the elements associated with the following areas:

- (i) Knowledge with respect to the following:
 - (A) the GPS system, including:
 - (I) GPS system components and aircraft equipment,
 - (II) the composition of satellite constellation,
 - (III) the minimum number of satellites required for 2-D and 3-D navigation,
 - (IV) the basic concept of satellite ranging,
 - (V) factors affecting the accuracy of GPS signals, and
 - (VI) the World Geodetic Survey 1984 (WGS 84) datum and the effect of using any other datum,
 - (B) human factors applicable to the use of GPS and how errors may be reduced or eliminated,
 - (C) company standard operating procedures for the use of GPS, and
 - (D) procedures for reporting GPS problems and database errors.
- (ii) Ability to perform the following operational tasks:
 - (A) select appropriate operational modes,
 - (B) recall categories of information contained in the database,
 - (C) predict RAIM availability,
 - (D) enter and verify user defined waypoints,
 - (E) recall and verify database waypoints,

- (F) interpret typical GPS navigational displays including latitude/longitude, distance and bearing to waypoint, course deviation indication (CDI), desired track (DTK), track made good (TMG), actual track (TK), cross track error and any other information appropriate for the equipment used,
 - (G) intercept and maintain GPS defined tracks,
 - (H) determine navigation information appropriate for the conduct of the flight including ground speed (GS), estimated time of arrival (ETA) for next waypoint and destination,
 - (I) indications of waypoint passage,
 - (J) use of 'direct to' function,
 - (K) link en route portion of GPS flight plan to approach,
 - (L) conduct SIDs, STARs, terminal area procedures and holds,
 - (M) retrieve, verify and conduct GPS stand alone approaches, and
 - (N) conduct GPS missed approaches.
- (iii) Ability to conduct the following operational and serviceability checks:
- (A) database currency and area of operation,
 - (B) receiver serviceability,
 - (C) RAIM status,
 - (D) CDI sensitivity,
 - (E) position indication, and
 - (F) number of satellites acquired and, if available, satellite position information.
- (iv) Ability to recognize and take appropriate action for all GPS warning and messages including, where applicable:
- (A) "loss of RAIM",
 - (B) "2-D navigation",
 - (C) "In Dead Reckoning Mode",
 - (D) "data base out of date",
 - (E) "GPS fail",
 - (F) "barometric input fail",
 - (G) "power/battery low or fail",
 - (H) "parallel offset on", and
 - (I) "satellite fail".

(c) Ground Training - Integrated Receivers (Flight Management Systems)

The private operator shall ensure that the training program candidates are trained to proficiency in each of the elements associated with the following areas:

(i) Knowledge with respect to the following:

(A) the GPS system and theory of operation, including:

- (I) GPS system components and aircraft equipment,
- (II) the composition of satellite constellation,
- (III) the minimum number of satellites required for 2-D and 3-D navigation,
- (IV) the basic concept of satellite ranging,
- (V) factors affecting the accuracy of GPS signals,
- (VI) the WGS84 datum and the effect of using any other datum,

(B) human factors applicable to the use of GPS and how errors may be reduced or eliminated (ie. maintaining situational awareness);

(ii) Ability to perform the following operational tasks:

- (A) predict RAIM availability,
- (B) link en route portion of GPS flight plan to approach,
- (C) conduct GPS stand alone approaches, and
- (D) conduct GPS missed approaches;

(iii) Ability to conduct the following operational and serviceability checks:

- (A) RAIM status,
- (B) CDI sensitivity,
- (C) number of satellites acquired and, if available, satellite position information; and

(iv) Ability to recognize and take appropriate action for all GPS warning and messages including, where applicable:

- (A) "loss of RAIM",
- (B) "2-D navigation",
- (C) "GPS fail",
- (D) "barometric input fail", and
- (E) "satellite fail".

(d) Flight Training

- (i) Each flight crew member shall complete flight training in the use of GPS for approach and other associated duties for each crew position they are authorized to occupy. Flight training may be completed in an aircraft, or in a level A or higher simulator that is equipped with the same model of GPS receiver that is installed in company aircraft.
- (ii) Flight training shall be conducted by a designated training pilot who has completed the approved company ground training program and demonstrated proficiency in the use of the model of GPS to an approved check pilot.

(5) Area Navigation Systems (RNAV) - General Training

(a) To qualify for an authorization for the use of RNAV navigation systems on IFR operations, a private operator shall have an approved flight crew training and qualifications program for use of the system. Each flight crew member shall have completed the appropriate training and have completed an in-flight check or an equivalent check in an approved synthetic training device. This qualification check shall be conducted by an approved check pilot.

(b) Training shall be in the following areas:

- (i) pre-flight initialisation, loading and verification procedures,
- (ii) normal operation of the system,
- (iii) procedures for manually updating the system's position,
- (iv) methods of monitoring and cross checking the system,
- (v) operation in the compass unreliability area,
- (vi) malfunction procedures,
- (vii) terminal procedures,
- (viii) waypoint symbology, plotting procedures, record keeping duties and practices,
- (ix) time keeping procedures, and
- (x) post flight performance verification.

(6) Pacific RNP-10 Training

To qualify for an authorization to conduct operations in Pacific RNP-10 airspace, a private operator shall provide initial and recurrent approved training programs that ensure that each flight crew member is proficient in the following areas:

- (a) flight planning for RNP-10 airspace;
- (b) navigation performance requirements for RNP-10 airspace;

- (c) en route procedures for RNP-10 airspace; and
- (d) contingency procedures for RNP-10 airspace.

(7) Reduced Vertical Separation Minima (RVSM) Training

To qualify for an authorization to conduct operations in RVSM airspace, a private operator shall have initial and recurrent approved training programs that ensure that each flight crew member is proficient in the following areas:

- (a) knowledge of the floor, ceiling and horizontal boundaries of the RVSM airspace to be operated in;
- (b) rules on exclusion of non-RVSM compliant aircraft;
- (c) pilot procedures with respect to:
 - (i) pre-flight and in-flight altimeter checks,
 - (ii) use of the automatic altitude control system,
 - (iii) Minimum Equipment List (MEL) items applicable to RVSM operations,
 - (iv) special procedures for in-flight contingencies,
 - (v) weather deviation procedures,
 - (vi) track offset procedures for wake turbulence and inconsequential collision avoidance systems alerts, and
 - (vii) pilot level-off call;
- (d) procedures for flight of non-RVSM compliant aircraft for maintenance, humanitarian or delivery flights; and
- (e) use of ACAS/TCAS.

624.27 Aircraft Operating Manual

An aircraft operating manual shall consist of the following:

- (a) a table of contents;
- (b) a list of effective pages;
- (c) amending procedures;
- (d) a preamble;
- (e) the identification of the aeroplane by the type and registration, that the manual applies to; and
- (f) the aeroplane's operating procedures and limitations.



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CARs

CANADIAN AVIATION REGULATIONS

PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 625 - AIRCRAFT EQUIPMENT AND MAINTENANCE

625

Canada 

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NOTE

All amendments to the CARs will be indicated by the Coming into Force date, immediately following the amended text.

RECORD OF AMENDMENTS

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STANDARD 625 - AIRCRAFT EQUIPMENT AND MAINTENANCE

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PART VI - GENERAL OPERATING AND FLIGHT RULES

STANDARD 625 - AIRCRAFT EQUIPMENT AND MAINTENANCE

625.03 *Flight Authority*

Information Note:

CAR 605.03(2) provides relief from the requirement to carry a ferry flight permit on board an aircraft where that flight is conducted wholly in Canadian airspace. This provision is included because of the difficulty in bringing a flight authority to an aircraft that may be down for maintenance in a remote location. Chapter 507 of the Airworthiness Manual provides the means to make application under these conditions.

625.04 *Reserved*

625.05 *Markings and Placards*

(1) The standards of airworthiness applicable to markings and placards are those requirements specified in:

- (a) the type certificate or aircraft flight manual;
- (b) a supplemental type certificate, repair design approval or any other technical data issued in respect of a modification embodied into the aircraft;
(amended 2009/12/01)
- (c) any applicable Airworthiness Directive; and
- (d) in the case of an aircraft operated pursuant to CAR 705, a manual prepared by the air operator, for example, a flight operating manual.

625.06 *Reserved*

625.07 *Minimum Equipment List*

Information Notes:

The following provisions, although considered advisory in nature, have been included in the main body of these standards due to their importance. They are not standards.

(i) Minimum Equipment Lists (MELs) provide an additional measure of control of defects. MELs are lists of systems and equipment installed in the aircraft, annotated to show the degree to which defects may be allowed for a limited period. In some cases, additional operational procedures or restrictions are applied. Procedures to troubleshoot, inspect or secure items prior to takeoff may also be identified as conditions for operation with the equipment inoperative.

(ii) The recent trend in MEL development is that the MEL should become an exhaustive list. As such, any item not listed in an MEL must be operable at the time of dispatch. Items such as entertainment systems or other items installed for the convenience of passengers are usually listed under the heading of passenger convenience equipment. MELs usually address only the operation or non-operation of systems and equipment, and do not cover degraded system performance, such as unusually slow landing gear retraction, excessive fuel consumption, etc. As such, an MEL does not allow for every possible combination of defects, or for the additional workload which may result from multiple defects.

(iii) Application of the MEL does not eliminate the need for the pilot to make his own assessment of the airworthiness of the aircraft, but it does indicate certain circumstances where operation is definitely not permitted. Once an MEL has been approved for use by a particular operator, compliance with it becomes mandatory. MELs are not transferable between operators.

(iv) Configuration Deviation Lists (CDLs) may be regarded as the structural equivalent of MELs. They permit operation of the aircraft with certain minor structural items missing. Examples of the types of item listed in a CDL include fairings, access panels, vortex generators and static discharge wicks. CDLs may not include primary structure, and like MELs, they address only the presence or absence of the listed items and take no account of degraded quality, such as dents, distortion, cracks or corrosion. In certain cases, they may allow deferral of rectification action for extended periods, such as to the next scheduled check. CDLs usually form an approved appendix to the aircraft flight manual and, as such, require no further approval prior to their use.

625.08 Reserved

625.09 Unserviceable Equipment - Aircraft with a Minimum Equipment List

625.10 Unserviceable Equipment - Aircraft without a Minimum Equipment List

Information Notes:

The following provisions, although considered advisory in nature, have been included in the main body of these standards due to their importance. They are not standards.

(i) CAR 605 requires that all equipment listed in the applicable airworthiness standard, and all equipment required for the particular flight or type of operation, must be functioning correctly prior to flight. The requirement for a particular system or component to be operative can be determined by reference to the type certificate data sheet, operating regulations or the applicable equipment list in the aircraft operating manual.

(ii) Although the responsibility for deciding whether an aircraft may be operated with outstanding defects rests with the pilot in command, an error in this determination could result in a contravention under these regulations. It is for this reason that the regulations require that full details of all defects be entered in the journey log. The pilot in command must be fully aware of the condition of the aircraft if he is to make the correct decision regarding the intended flight. The manner in which the pilot makes this decision, however, will vary

according to the type of operation of the aircraft. In the following paragraphs, private and commercial aircraft are considered separately.

(iii) Defects (e.g. buckling, cracks, extensive corrosion) of the skin or structure of the aircraft or of the pressure hull of a pressurized aircraft beyond the safe limits established by the manufacturer in his maintenance manual or other approved maintenance instructions will render that aircraft unfit for safe operation.

(iv) In the case of an aeroplane or helicopter not operated pursuant to Part IV, or an aircraft not operated pursuant to Part VII, the pilot must review the log prior to flight and decide whether any of the defects recorded affect the airworthiness of the aircraft. Reference may be made to the type certificate data sheet, the aircraft operating manual, or any list provided by the aircraft manufacturer respecting equipment that must be operational for the intended flight. The Minister may also approve a minimum equipment list for use by an owner. Any or all of these may indicate that particular items of equipment are mandatory.

(v) In the case of an aircraft operated pursuant to CAR 604, specific instructions must be provided in the operations manual to facilitate this assessment.

(vi) Where in doubt, the pilot should obtain the advice of an AME. This is best done by requesting the AME to inspect the defective system or component to determine its effect upon the aircraft's fitness for flight. By following this procedure and obtaining the AME's signature in the log book in the form of a maintenance release, the pilot will be able to demonstrate, if necessary, that he has taken all reasonable steps to ensure the airworthiness of the aircraft. Inspection of defective systems by an AME, although advisable, is not a legal requirement. As stated earlier, it is the pilot's responsibility to determine whether the aircraft is fit for the intended flight.

(vii) In the case of an aeroplane or helicopter operated pursuant to Part IV, or an aircraft operated pursuant to Part VII, it is not always practicable for the pilot to personally undertake all actions required to determine the airworthiness status, because of the high levels of utilization, complexity of the aircraft, and the limited time available for all the various aspects of pre-flight preparation required. A common standard must be applied to all aircraft of a fleet. For these reasons, the flight training unit and the air operator regulations require the establishment of a formal system for the control of defects.

(viii) Such systems provide a greater degree of confidence that the airworthiness effects of defects have been taken into account, and ensure consistency of application of the standards. They also set limits on the periods for which the repair of a defect may be deferred. For aircraft operated in commercial air service, this system is normally based on the use of Minimum Equipment Lists (MEL), thereby providing the pilot with a sound basis on which to make his decision regarding the intended flight.

(ix) The final decision, however, still rests with the pilot. A pilot who accepts an aircraft with defects, the repair of which has been deferred in accordance with an approved system, has a good defence against any possible charge of flying an unairworthy aircraft, whereas a pilot who undertakes a flight with an aircraft that is not in compliance with the approved system to control the deferral of repairs to defects commits an offence.

(x) The complexity of a system used to control the deferral of repairs to defects will vary according to the type of aircraft operated and the size and nature of the operation and may

include reference to an approved minimum equipment list and/or configuration deviation list. In all cases the control system must be described in the air operator's maintenance control manual. Once approved, compliance with those procedures is mandatory.

625.11 to 625.13 Reserved

625.16 Power-driven Aircraft - Night VFR

(1) The position lights and anti-collision lights referred to in CAR 605.16(1)(k) shall meet the requirements set out in Schedule 1 of Appendix I of this standard, and shall:

- (a) comply with the standards of light distribution, intensity and colour, and the flashing characteristics, where applicable, in accordance with the *Airworthiness Manual*;
- (b) be installed in accordance with the requirements set out in Chapter 551 of the *Airworthiness Manual*; and
- (c) not cause glare or other annoyance to a flight crew member to the extent that the person's ability to perform duties safely is affected.

**625.33 Flight Data Recorders and Cockpit Voice
Recorders**

In this section, a reference to the date on which an aircraft is manufactured is a reference to the date on which the manufacturer has signed the statement of conformity certifying that the aircraft conforms to the approved type design.

(amended 2003/09/01)

I - Flight Data Recorders (FDRs)

(1) Unless otherwise stated in these standards, an FDR installed on board an aircraft pursuant to paragraphs 605.33(1)(a) and (b) of the CARs, shall:

(amended 2003/09/01)

(a) record and store in a digital manner the parameters

(amended 2003/09/01)

(i) generally provided for below by way of reference to Schedule 2, 3, 4 or 5, as the case may be, of Appendix I to this standard, within the ranges, accuracies, intervals and resolution referred to therein, or

(amended 2003/09/01)

(ii) specifically provided for in subsection (3), (4) or (5);

(amended 2003/09/01)

(b) facilitate the retrieval of the parameters referred to in paragraph (a) from the digital storage medium used in the FDR; and

(amended 2003/09/01)

(c) be equipped with an underwater locating device to assist in locating the FDR.

(amended 2003/09/01)

(2) An FDR installed on board a multi-engine turbine-powered aeroplane pursuant to paragraph 605.33(1)(a) of the CARs, in respect of which a type certificate has been issued authorizing the transport of 30 or fewer passengers, that is configured for 10 to 19 passenger seats and that has a date of manufacture after October 11, 1991, shall record the parameters specified in Schedule 2 of Appendix I.
(amended 2003/09/01)

(3) An FDR installed on board a multi-engine turbine-powered aeroplane pursuant to paragraph 605.33(1)(b) of the CARs, in respect of which a type certificate has been issued authorizing the transport of 30 or fewer passengers and that is configured for 20 to 30 passenger seats, shall record, to within the ranges, accuracies, sampling intervals and resolutions specified in Schedule 3 of Appendix I, the parameters listed below:
(amended 2003/09/01)

(a) subject to paragraph (c), for aeroplanes in respect of which a type certificate has been issued before October 1, 1969, the following parameters:
(amended 2003/09/01)

- (i) time,
- (ii) altitude,
- (iii) airspeed,
- (iv) vertical acceleration,
- (v) heading,
- (vi) time of each radio transmission to or from air traffic control,
- (vii) pitch attitude,
- (viii) roll attitude,
- (ix) longitudinal acceleration,
- (x) control column or pitch control surface position, and
- (xi) thrust of each engine;

(b) subject to paragraph (c), for aeroplanes in respect of which a type certificate has been issued after September 30, 1969, the following parameters:
(amended 2003/09/01)

- (i) time,
- (ii) altitude,
- (iii) airspeed,
- (iv) vertical acceleration,
- (v) heading,
- (vi) time of each radio transmission to, or from, air traffic control,

- (vii) pitch attitude,
- (viii) roll attitude,
- (ix) longitudinal acceleration,
- (x) pitch trim position,
- (xi) control column or pitch control surface position,
- (xii) control wheel or lateral control surface position,
- (xiii) rudder pedal or yaw control surface position,
- (xiv) thrust of each engine,
- (xv) position of each thrust reverser,
- (xvi) trailing edge flap or cockpit flap control position, and
- (xvii) leading edge flap or cockpit flap control position;

(c) for aeroplanes with a date of manufacture after October 11, 1991, all of the parameters listed in Schedule 3.

(amended 2003/09/01)

(4) An FDR installed on board a multi-engine turbine-powered aeroplane pursuant to paragraph 605.33(1)(c) of the CARs, in respect of which a type certificate has been issued before October 1, 1969, authorizing the transport of more than 30 passengers and with a date of manufacture before May 26, 1989, shall record to within the ranges, accuracies, sampling intervals and resolutions specified in Schedule 3, the parameters listed below:

(amended 2003/09/01)

- (a) time;
- (b) altitude;
- (c) airspeed;
- (d) vertical acceleration;
- (e) heading;
- (f) time of each radio transmission to or from air traffic control;
- (g) pitch attitude;
- (h) roll attitude;
- (i) longitudinal acceleration;
- (j) control column or pitch control surface position; and
- (k) thrust of each engine.

(5) An FDR installed on board a multi-engine turbine-powered aeroplane pursuant to paragraph 605.33(1)(c) of the CARs, in respect of which a type certificate has been issued after September 30, 1969, authorizing the transport of more than 30 passengers, or installed on board an aircraft in respect of which a type certificate has been issued before October 1, 1969, authorizing the transport of more than 30 passengers and with a date of manufacture after May 26, 1989, shall record to within the ranges, accuracies, sampling intervals and resolutions specified in Schedule 3, the parameters listed below:

(amended 2003/09/01)

- (a) time;
- (b) altitude;
- (c) airspeed;
- (d) vertical acceleration;
- (e) heading;
- (f) time of each radio transmission to or from air traffic control;
- (g) pitch attitude;
- (h) roll attitude;
- (i) longitudinal acceleration;
- (j) pitch trim position;
- (k) control column or pitch control surface position;
- (l) control wheel or lateral control surface position;
- (m) rudder pedal or yaw control surface position;
- (n) thrust of each engine;
- (o) position of each thrust reverser;
- (p) trailing edge flap or cockpit flap control position; and
- (q) leading edge flap or cockpit flap control position.

(6) Despite subsection (5), an FDR installed on board a multi-engine turbine-powered aeroplane pursuant to paragraph 605.33(1)(c) of the CARs, in respect of which a type certificate has been issued authorizing the transport of more than 30 passengers, and with a date of manufacture after October 11, 1991, shall record the parameters specified in Schedule 3 of Appendix I.

(amended 2003/09/01)

(7) An FDR installed on board a multi-engine turbine-powered aeroplane pursuant to paragraph 605.33(1)(c) of the CARs, in respect of which a type certificate has been issued authorizing the transport of more than 30 passengers and that is equipped with a digital data bus and Aeronautical Radio Incorporated 717 digital flight data acquisition unit (ARINC 717 DFDAU), or equivalent, shall record the parameters specified in Schedule 3 of Appendix I for

those parameters that are available on the digital data bus.
(amended 2003/09/01)

(8) An FDR installed on board an aeroplane pursuant to paragraph 605.33(1)(d) of the CARs, in respect of which a type certificate has been issued authorizing the transport of cargo only shall comply with the standards in force on the date of issuance of the type certificate or on the date of manufacture of the aeroplane, whichever is the latest, as specified in subsection (4), (5), (6) or (7).
(amended 2003/09/01)

(9) An FDR installed on board a multi-engine turbine-powered helicopter pursuant to paragraph 605.33(1)(a) of the CARs, that is configured for 10 to 19 passenger seats, and with a date of manufacture after October 11, 1991, shall record the parameters specified in Schedule 4 of Appendix I.
(amended 2003/09/01)

(10) An FDR installed on board a multi-engine turbine-powered helicopter pursuant to paragraph 605.33(1)(a) or (c) of the CARs, that is configured for 20 or more passenger seats, and with a date of manufacture after October 11, 1991, shall record the parameters specified in Schedule 5 of Appendix I.
(amended 2003/09/01)

II - Cockpit Voice Recorders (CVRs)

(1) A CVR installed on board an aircraft pursuant to subsection 605.33(2) of the CARs, shall continuously record:
(amended 2003/09/01)

(a) voice communications transmitted from, or received by, the aircraft concerning the operation of the aircraft;
(amended 2003/09/01)

(b) the aural environment of the flight deck, including:

(i) the audio signals received from each microphone being used by a flight crew member,
(ii) voice communications of flight crew members using the aircraft's interphone system and the public address system, and
(amended 2003/09/01)

(iii) voice communications or audio signals identifying navigation or approach aids detected by a headset or speaker.

(2) A CVR installed on board an aircraft with a date of manufacture after October 11, 1991 and brought onto the register after the coming into force date of this section, shall record continuously the information specified in (1) with reference to a time scale.
(amended 2003/09/01)

(3) A CVR installed on board an aircraft manufactured after December 31, 2002, shall retain all information recorded during the aircraft's operation, or all information recorded during the last two hours of the aircraft's operation, whichever is less.
(amended 2003/09/01)

(4) A CVR installed on board any aircraft other than one referred to in subsection (3), shall retain all the information recorded during the aircraft's operation, or all the information recorded during the last 30 minutes of the aircraft's operation, whichever is less.
(amended 2003/09/01)

(5) An aircraft with a date of manufacture after October 11, 1991, or on which a CVR has been installed after the coming into force of this section, shall be equipped to record the uninterrupted audio signals received by a boom or mask microphone.
(amended 2003/09/01)

(6) Each flight crew member of an aircraft equipped to record the uninterrupted audio signals received by boom or mask microphone in accordance with subsection (5), shall use the boom or mask microphone when operating below 10,000 feet mean sea level.
(amended 2003/09/01)

(7) An aircraft in respect of which a type certificate has been issued authorizing the transport of more than 30 passengers shall have an approved underwater locating device on or adjacent to the recorder container which is secured in such a manner that they are not likely to be separated during crash impact, unless the FDR and CVR required by this section are installed adjacent to each other in such a manner that they are not likely to be separated during crash impact.

625.36 Altitude Alerting Systems

(1) Pursuant to CAR 605.36(1), the altitude alerting system, or device, shall:

(a) alert the pilot on approaching a preselected altitude, either in ascent or descent, in sufficient time for level flight to be established at the preselected altitude:

(i) by producing a sequence of aural and visual signals during operations at 3,000 feet or more above ground level; and

(ii) by producing a sequence of aural or visual signals during operations at less than 3,000 feet above ground level; and

(b) produce the signals described in paragraph (a) from sea level to the highest operating altitude approved for the aeroplane.

Information Note:

The altitude alert system or device may be tested without special equipment.

625.41 Standby Attitude Indicator

(1) Pursuant to CAR 605.41, the standby attitude indicator shall:

(a) be powered from a source independent of the electrical generating system;

(b) be operative without selection after total failure of the electrical generating system;

(c) continue reliable operation for a minimum of 30 minutes after total failure of the electrical generating system;

(d) operate independently of any attitude indicator system; and

(e) have the indicating instrument:

- (i) located in a position on the instrument panel where it is plainly visible to and usable by any pilot at his pilot station; and
- (ii) appropriately illuminated during all phases of operation.

625.84 *Aircraft Maintenance - General*

Information Notes:

(i) *Details regarding the approval of maintenance schedules are given in 625.86 of these standards.*

(ii) *Airworthiness Limitations are those requirements that result when the design analysis of the aircraft shows that certain tasks are required to ensure the aircraft remains in compliance with the design standards contained in the certification basis shown on the type certificate.*

(amended 2009/12/01)

(iii) *Airworthiness Limitations may be in the form of:*

(A) life-limited parts;

(B) an inspection task required by any supplemental inspection document (SID) which has been published by the manufacturer for that aircraft;

(C) Certification Maintenance Requirements (CMRs), either issued by the manufacturer, or by a person holding the design certification for a modification that has been embodied into an aircraft; and

(amended 2009/12/01)

(D) any other limitation issued by a manufacturer when set out in the instructions for continued airworthiness, issued pursuant to the certification basis.

(amended 2009/12/01)

(iv) *Canadian Airworthiness Directives (ADs) are issued under Division X of CAR 521, and are applicable to all Canadian registered aircraft, engines, propellers, appliances and parts for which a design approval document has been issued, except for aircraft that are operated under a special certificate of airworthiness in the owner-maintenance classification. A Canadian AD takes precedence over any equivalent foreign notice.*

(amended 2009/12/01)

(v) *Where no Canadian AD exists, owners are required to comply with equivalent notices issued by a foreign state, provided that state is responsible for the type design of the aircraft.*

(A) For this purpose, it is the state responsible for the type design, not necessarily the state of manufacture, whose equivalent notices are mandatory. This might be the case where an aircraft is designed in state X but manufactured in state Z. The equivalent notices issued by country X are mandatory in respect to that aircraft. The equivalent notices issued by state Z need not be followed unless the owner feels it would be appropriate.

(amended 2009/12/01)

(B) Appendix H of this standard and Division X of CAR 521 further detail the associated AD information.

(amended 2009/12/01)

625.85 *Maintenance Release and Elementary Work*

(1) Pursuant to subsection 605.85(4) of the CARs, no maintenance release is required in respect of the tasks identified as elementary work in Appendix A of this standard.
(amended 2007/12/30)

Information Notes:

(i) The regulations in Subpart 571 of the CARs provide specific qualifications for personnel who can sign a maintenance release. It is the owner's responsibility to ensure that only personnel meeting those qualifications sign a maintenance release in respect of their aircraft, engines, propeller or other installed components.
(amended 2007/12/30)

(A) The standards applicable to a maintenance release are set out in Standard 571.
(amended 2007/12/30)

(ii) Elementary work does not require a maintenance release to be signed by an AME; however, pursuant to section 571.03 of the CARs, any elementary work performed on an aircraft must be detailed in the technical record, and must be accompanied by the signature of the person who performed the work.
(amended 2007/12/30)

(iii) Owners of amateur-built aircraft or aircraft operated pursuant to a special certificate of airworthiness in the owner-maintenance classification can perform the work and sign the maintenance release with respect to their own aircraft.
(amended 2002/03/01)

625.86 *Maintenance Schedules*

Information Notes:

(i) The phrase "no person shall conduct a takeoff, or permit another person to conduct a take off" is used in the regulations to clearly emphasize an aircraft owner's responsibility to advise any person operating his/her aircraft of any maintenance that the aircraft might require pursuant to the regulations.

(ii) CAR Part I defines "Owner" as the person who has legal custody and control of the aircraft.

(1) Pursuant to CAR 605.86, all aircraft, other than ultra-light or hang-gliders, shall be maintained in accordance with a maintenance schedule, approved by the Minister, that meets the requirements of this Aircraft Equipment and Maintenance Standard 625.

(2)

(a) As applicable to the type of aircraft, at intervals not to expire later than the last day of the 12th month, following the preceding inspection, Part I and Part II of the Maintenance Schedule detailed in Appendix B of these standards are approved by the Minister for use on other than large aircraft, turbine-powered pressurized aeroplanes, airships, any aeroplane or helicopter operated by a flight training unit under CAR 406, or any aircraft operated by air

operators under CAR Part VII.
(amended 2007/12/30)

(b) Owners of non-commercially operated small aircraft and balloons must also comply with Appendix C with respect to out of phase tasks and equipment maintenance requirements.

(c) Owners of non-commercially operated small aircraft and balloons who choose to comply with Parts I or II of Appendix B as applicable, and Appendix C, need not submit any documents to the Minister for formal approval. The schedule is considered to be approved for their use by the Minister. Owners need only to make an entry in the aircraft technical records that the aircraft is maintained pursuant to the maintenance schedule.

Information Notes:

(i) Part I of Appendix B of these standards applies to small piston engine aircraft and small helicopters not operated in a flight training unit or in a commercial air service, and is performed on an annual basis (i.e. at intervals not exceeding 12 months).

(ii) Part II of Appendix B of these standards applies to balloons not operated in a flight training unit, in special flight operations, or in a commercial air service and is performed on an annual basis (i.e. at intervals not exceeding 12 months).

(3)

(a) As applicable to the type of aircraft, and when performed in accordance with the guidelines specified therein, at intervals not exceeding 100 hours air time, Part I and Part II of Appendix B of these standards are approved by the Minister for use with respect to balloons operated under CAR 603, to aeroplanes and helicopters operated by flight training units under CAR 406, and to aircraft operated by air operators under CAR Part VII, provided the aircraft are not large aircraft or pressurized turbine-powered aeroplanes.

(b) Owners of commercially operated small aircraft must also comply with Appendix C with respect to out of phase tasks and equipment maintenance requirements.

(c) Owners of commercially operated balloons must comply with Part II of Appendix B, and Appendix C, but need not submit any documents to the Minister for formal approval. The schedule is considered to be approved for their use by the Minister. Owners need only to make an entry in the technical records that the balloon is maintained pursuant to the maintenance schedule.

Information Notes:

(i) Part I of Appendix B of these standards applies only to small piston engine aircraft and small helicopters operated in a flight training unit or in a commercial air service, and is performed at intervals not exceeding 100 hours air time.

(ii) Part II of Appendix B of these standards applies to balloons operated in a flight training unit, in special flight operations or in a commercial air service, and is performed at intervals not exceeding 100 hours air time.

(d) Owners of commercially operated small aircraft, other than balloons, who choose to comply with Part I of Appendix B, and Appendix C, must submit their maintenance schedule for approval by the Minister, in accordance with Appendix D.

(e) Owners of commercially operated small aircraft, other than balloons, may, on the other hand, choose to comply with Appendices C and D, with respect to their maintenance schedule. The latter must be approved by the Minister.

(4) Large aircraft, aeroplanes and helicopters operated by flight training units under CAR 406, large aircraft operated under CAR Part VII, pressurized turbine-powered aircraft, and airships shall be maintained in accordance with the terms of a maintenance schedule that meets the requirements of Appendices C and D and be approved by the Minister. In the case of an operator bringing into use a type of aircraft which they have not previously operated, the Minister can approve, for a limited period of time, the use of an interim schedule which meets the requirements of Appendices C and D, to allow operation of the aircraft while the complete maintenance schedule is under development or review.

Information Note: *Appendix D of these standards applies to: large aircraft; aeroplanes and helicopters operated in a flight training unit; large aircraft operated in a commercial air service; all pressurized turbine-powered aircraft; and airships.*

(5) Maintenance schedules, including interim schedules, approved under the provisions of Appendix D pursuant to CAR 605.86(2), shall:

- (a) be based upon data obtained from a current, and approved, maintenance review board (MRB) report; or
- (b) where no current MRB report exists, be based upon data obtained from:
 - (i) the current recommendations of the aircraft manufacturer;
 - (ii) a maintenance schedule approved by the Minister for use by another operator; or
 - (iii) any other data acceptable to the Minister.

Information Note: *The list shown in (5)(b) above is in the usual order of preference (i.e. the current manufacturer's recommendations take priority over third-party programs, or other sources). Where an operator wishes to use data which deviates from the above order of preference, the onus is on the applicant to demonstrate that the proposed program is more appropriate to their operation.*

(6) Maintenance schedules approved under this section shall contain inspection requirements for the airframe, engine(s), propeller(s), appliances, survival equipment, emergency equipment and other equipment installed on the aircraft, including the applicable out of phase and equipment maintenance requirements of Appendix C, and shall take into account the requirements of any modifications made to the aircraft.

(7) Maintenance schedules approved under this section are not transferrable to another owner or operator without the prior approval of the Minister.

(8) Prior to the commencement of any tolerance to a task required by the maintenance schedule:

(amended 2008/12/30)

(a) in the case of an aircraft operated pursuant to Subparts 406, 604 or Part VII, use of the tolerance shall be authorized and controlled in accordance with the operator's approved procedures as set forth in the applicable operations manual maintenance control manual; (amended 2008/12/30)

(b) in the case of any other aircraft, the aircraft shall be inspected by the holder of an applicable and valid AME license to ensure that it is in satisfactory condition to operate for the period of the tolerance; (amended 2008/12/30)

(c) where the inspection or other work required to support use of a tolerance constitutes a maintenance activity, a maintenance release will be required; and (amended 2008/12/30)

(d) tolerances are not permitted in respect of tasks mandated by airworthiness limitations or airworthiness directives; (amended 2008/12/30)

Information Notes

(amended 2008/12/30)

(i) The manufacturer's tolerance recommendations in an operator's maintenance schedule is subject to approval by the Minister. The applicant must demonstrate that the circumstances leading to the application of a tolerance are within the control of the applicant and that the approval of tolerances will not jeopardize the safety of the product or service. Moreover, if the Minister becomes aware that the operator is misusing the tolerances, or that the pertinent procedures set out in the MCM or operations manual are not being followed, the approval of the tolerances may be withdrawn by the Minister; (amended 2008/12/30)

(ii) Each check set out in a maintenance schedule must be tracked independently. For example, a 1,000-hour check is not the 10th 100-hour check. It is a check due 1000 hours from the last 1,000-hour inspection; (amended 2008/12/30)

(iii) Each scheduled interval of a task is calculated from the time the task was last carried out, regardless if a tolerance is applied. For example, where the first interval of a 100-hour check is carried out at 110 hours, the next inspection is due at 210 hours; (amended 2008/12/30)

(iv) The intervals applicable to the tasks forming part of progressive inspections are to be kept in the same order of events. For example, where the manufacturer's recommendation is to accomplish a task each 200 hours, if that task is carried out in the beginning of a first phase of a 200-hour cycle, it must be repeated in the same time frame of the next cycle. Otherwise, if that particular task is carried out at the end of the last phase of the next cycle, it could

inappropriately accumulate close to 400 hours between tasks accomplishments.
(amended 2008/12/30)

(v) Prior to the commencement of a tolerance to a component task interval, maintenance action may be required to confirm continued serviceability of the component. For example, before using a tolerance to an engine TBO, filter checks or power runs may be appropriate.
(amended 2008/12/30)

(9) Under the provisions of CAR 605.86(3), the Minister can, on receipt of a fully documented application, authorize an operator to exceed his approved inspection interval. Such authorizations shall be applicable on a case by case basis, and do not constitute a permanent amendment to the operator's approved maintenance schedule. Prior to the commencement of any authorization issued pursuant to this subsection, the aircraft shall be inspected to the degree necessary to ensure that it is airworthy, and in satisfactory condition to operate for the period covered by the authorization.

(10) An owner or operator using a maintenance schedule approved in accordance with this section, shall amend that schedule when so directed by the Minister.

(11) Pursuant to CAR 605.86(3), an owner or operator using a maintenance schedule approved in accordance with this section can also amend the schedule as a result of operating experience, provided that, prior to utilizing the provisions of the amended schedule, the amendment is:

(a) approved by the Minister; or

(b) approved in accordance with a Maintenance Monitoring Program that meets the requirements of Appendix E of these standards.

625.87 *Transfer of Aeronautical Products Between Maintenance Schedules*

(1) The standards applicable to the permanent transfer of an aeronautical product are contained in Appendix F of these standards. These requirements must be met at any time an aeronautical product is transferred between maintenance schedules, except that, where a part is supplied by an approved overhaul organization as a temporary replacement, it is maintained in accordance with a maintenance schedule approved for that specific purpose.

(2) Provided that their approved maintenance control manual contains procedures for the use of borrowed parts, a flight training unit or an air operator can borrow an aircraft part from another person and can use such part for a maximum of 100 flight hours or 90 days, whichever is greater, without compliance with Appendix F requirements, even though the time in service of such part exceeds the borrower's approved inspection intervals.

(3) The requirements contained in Appendix F of these standards do not apply to products which are subject to airworthiness limitations. The limitations remain unchanged, as per the type certificate.

625.88 *Inspections after Abnormal Occurrences*

Appendix G of this standard sets out inspection requirements and other guidance related to abnormal occurrences.

625.89 to 625.91 *Reserved***625.93 Technical Records - General**

(1) Pursuant to Item 4 of Schedule I to subpart 605, persons calculating times between maintenance activities need only consider air time (i.e. the intervals from the moment an aircraft leaves the ground until it touches the ground at the end of the flight); the air time specified must be the actual air time, and not arrived at by calculation from the total flight time.

(amended 2008/12/30)

(2) Pursuant to CAR 605.93(3), technical records kept as electronic data shall be protected from damage, or loss, to the same extent as that provided to paper records.

(3) Pursuant to CAR 605.93(6), corrections to technical records, kept as electronic data, shall be done in a manner which will ensure that no original entry is deleted.

Information Notes:

(i) To cater for the correction of errors, electronic record keeping systems may include provision to alter the existing records, provided the record clearly shows that a change has been made and includes all the relevant details, including the identity of the person making the change, the reason for the change, and the content of the original entry prior to the change.

(amended 2008/12/30)

(ii) Computer systems used to control maintenance and/or record details of maintenance work carried out should have at least one back-up system updated on a regular basis of any maintenance task entered. Each computer terminal and/or computer network should contain program safeguards against the alteration of the database through:

(amended 2008/12/30)

(a) "accidental" - means by authorized personnel; or,

(b) "intentional" - means by unauthorized individuals.

(4) Pursuant to items 9 and 10 of Schedule I to subpart 605, the only defects that are specifically required to be entered in the aircraft journey log are those defects that arise during flight operations, and those defects that have not been rectified before the next flight of the aircraft. All other defects may be entered directly into the applicable airframe, engine, propeller or component record. Details of the rectification of defects, and the maintenance release for such rectification, shall be entered into the same record that contained the original entry for the defect. Where the details of the defect, and its rectification and release, were first entered into the journey log, they shall be transcribed into the applicable airframe, engine, propeller or component record within 30 days.

(amended 2008/12/30)

Information Notes:

(amended 2008/12/30)

(i) The purpose of the above provision is to recognize that defects are often found and rectified during maintenance, and the volume of such occurrences may make it impractical to enter them all into the journey log. The details may in these cases be entered directly into the applicable airframe, engine, propeller or component record, provided that the maintenance

concerned is completed, and the release signed, before further flight of the aircraft. In all cases, details of unrectified defects or other outstanding maintenance must be entered in the aircraft journey log as must the details of the rectification of all defects that were initially recorded in the journey log.
(amended 2008/12/30)

(ii) Pursuant to item 4 of Schedule II to subpart 605, particulars of any maintenance performed must be entered into the applicable airframe, engine, propeller or component record. When maintenance events such as scheduled maintenance, Airworthiness Directive compliance, major modifications or major repairs are accomplished, and only the aircraft journey logbook is available, it is suggested to have the maintenance provider furnish an additional copy of the maintenance release certifications, signed in ink, on paper that can later be permanently bonded into the applicable airframe, engine, propeller or component technical log page.
(amended 2008/12/30)

625.96 Technical Records other than Journey Logs

- (1) Pursuant to CAR 605.96, the owner of an aircraft shall maintain and retain technical records, other than the Journey Log, until such time as the aircraft is no longer registered.
- (2) Technical records pertaining to repetitive inspections of aircraft need only be retained until the inspection activity is repeated.

APPENDIX A - ELEMENTARY WORK

(Refer to section 625.85 of this standard.)

(amended 2004/03/01)

The following list is exhaustive; if a task is not listed, it is not elementary work. Elementary work is a form of maintenance that is not subject to a maintenance release. Hence, it need not be performed by a holder of an AME licence, or by persons working under an AMO certificate. The owner is responsible for controlling authorizations to persons who may perform elementary work.

(amended 2004/03/01)

For aircraft operated pursuant to Subpart 406 and Part VII, the applicable tasks listed below are elementary work, provided they are individually listed in the operator's maintenance control manual and or operational manual as applicable, along with a reference to the training to be undertaken by persons authorized to perform them in accordance with paragraph 571.10(3)(b) of the CARs.

(amended 2004/03/01)

The performance of all tasks designated as elementary work shall be entered in the technical record for the aeronautical product, as required by section 571.03 of the CARs and in accordance with Subpart 605, Division IV – Technical Records.

(amended 2004/03/01)

Information Note: *Under section 605.93 of the CARs, every person who makes an entry in a technical record shall enter the person's name and, if the entry is in respect of the performance of maintenance or elementary work, the signature or employee identifier or, where the record is kept as electronic data, enter the person's user code or an equivalent security designation.*

(amended 2004/03/01)

Elementary Work Task Listings

(1) fabric patches measuring not more than 15 cm (6 in) in any direction and not requiring rib stitching or the removal of control surfaces or structural parts, on small privately operated aircraft;

(amended 2004/03/01)

(2) removal and replacement of tires, wheels, landing skids or skid shoes, not requiring separation of any hydraulic lines, on small privately operated aircraft;

(amended 2004/03/01)

(3) removal and replacement of skis on fixed landing gear, not requiring separation of any hydraulic lines, on small privately operated aircraft;

(amended 2004/03/01)

(4) repair of non-structural fairings, cover plates and cowlings, on small privately operated aircraft;

(amended 2004/03/01)

(5) cleaning and replacement of spark plugs, on small privately operated aircraft;

(amended 2004/03/01)

- (6) checking of cylinder compression, on small privately operated aircraft;
(amended 2004/03/01)
- (7) cleaning or changing of fuel, oil, and air filters, on small privately operated aircraft;
(amended 2004/03/01)
- (8) draining and replenishing engine oil, on small privately operated aircraft;
(amended 2004/03/01)
- (9) checking the electrolyte level and specific gravity of lead acid batteries, on small privately operated aircraft;
(amended 2004/03/01)
- (10) adjustment of generator or alternator drive belt tension, on small privately operated aircraft;
(amended 2004/03/01)
- (11) cleaning of balloon burner nozzles;
(amended 2004/03/01)
- (12) removal and replacement of balloon baskets, burners and gas tanks that are designed for rapid change in service;
(amended 2004/03/01)
- (13) removal and replacement of glider wings and tail surfaces that are designed for quick assembly;
(amended 2004/03/01)
- (14) repair of upholstery, trim and cabin furnishings;
(amended 2004/03/01)
- (15) removal and replacement of role equipment designed for rapid removal and replacement;
(amended 2004/03/01)
- (16) removal and replacement of passenger seat belts and harnesses;
(amended 2004/03/01)
- (17) removal and replacement of fuses, light bulbs and reflectors;
(amended 2004/03/01)
- (18) removal and replacement of avionics components that are rack mounted or otherwise designed for rapid removal and replacement, where the work does not require testing other than an operational check;
(amended 2004/03/01)
- (19) removal and replacement of aircraft batteries;
(amended 2004/03/01)
- (20) removal and replacement of co-pilot control levers, wheels, pedals and pedal guard plates that are designed for rapid removal and replacement, on other than transport category aircraft;
(amended 2004/03/01)

- (21) opening and closing of non-structural access panels;
(amended 2004/03/01)
- (22) removal and replacement of cabin doors on unpressurized aircraft, where the door is designed for rapid removal and replacement;
(amended 2004/03/01)
- (23) removal, replacement and repositioning of non structural partitions in the passenger cabin;
(amended 2004/03/01)
- (24) inspection and continuity checking of self-sealing chip detectors;
(amended 2004/03/01)
- (25) removal and replacement of induction system anti-icing baffles, scoops and deflectors that are designed for rapid removal and replacement;
(amended 2004/03/01)
- (26) removal, cleaning, replacement and adjustment of external components of chemical dispersal systems that are designed for rapid removal and replacement;
(amended 2004/03/01)
- (27) deactivating or securing inoperative systems in accordance with sections 605.09 or 605.10 of the CARs, including the installation of devices specifically intended for system deactivation, where the work does not involve disassembly, the installation of parts, or testing other than operational checks;
(amended 2004/03/01)
- (28) checking and adjusting air pressure in helicopter floats and aircraft tires except on aircraft operated under CAR 705.
(amended 2011/12/30)
- (29) repetitive visual inspections or operational checks (including inspections and tests required by airworthiness directives) not involving disassembly or the use of visual aids, performed out of phase with the aircraft's scheduled check cycle at intervals of less than 100 hours air time, provided the tasks are also included in the most frequent scheduled maintenance check.
(amended 2004/03/01)

Information Notes:

- (i) An operational check referred to in (27) above constitutes a check to determine if the unit is working. Operational checks do not involve measuring the unit's performance against a predetermined standard. Where the testing procedures require such measurement, replacement of the unit shall not constitute Elementary Work.
(amended 2004/03/01)
- (ii) Tasks referred to in (29) above are elementary work when performed out of phase, but require a maintenance release when done as part of a scheduled maintenance check.
(amended 2004/03/01)

APPENDIX B - MAINTENANCE SCHEDULES

General Procedures

(1) The Maintenance Schedule includes:

- (i) Part I - Scheduled Inspections for Aircraft other than Balloons;
- (ii) Part II - Scheduled Inspections for Balloons.

It must be supplemented by the applicable requirements of Appendix C, for out of phase tasks and equipment maintenance requirements.

(2) Each person performing inspections required by the maintenance schedule shall record the inspections in the aircraft technical record, using a check list that includes all items in Parts I or II that are applicable to the aircraft concerned. Additionally, all tasks required by Appendix C shall be recorded in the aircraft technical record.

Information Note:

Aircraft manufacturers' check lists can be used, provided that they include all the applicable items listed herein.

(3) The tasks listed in the maintenance schedule are described in general terms only, as the specific items applicable to particular aircraft will vary according to aircraft type.

(4) The method of inspection for each item on the maintenance schedule shall be in accordance with the manufacturer's recommendations or standard industry practice.

Information Note:

The following is provided as a quick reference chart. The specific details are contained in: Section 625.86; the relevant paragraphs of this Appendix (B); Appendix C; and Appendix D of these standards.

MAINTENANCE SCHEDULES - QUICK REFERENCE CHART	
Type of Aircraft and Operation	Content and Interval
Non-commercial <ul style="list-style-type: none"> • Small aircraft - Excluding pressurized turbine-powered aircraft & balloon. • Balloon 	<ul style="list-style-type: none"> • Appendix B, Part I @ 12 months + Appendix C • Appendix B, Part II @ 12 months + Appendix C
Commercial <ul style="list-style-type: none"> • Small aircraft - Excluding pressurized turbine-powered aircraft & balloons. (amended 1998/06/01) • Balloon 	<ul style="list-style-type: none"> • Program approved for operator in accordance with Appendix D. May be based upon Appendix B, Part I @ 100 hours or 12 months whichever comes first + Appendix C. (amended 1998/06/01) • Appendix B, Part II @ 100 hours + Appendix C

MAINTENANCE SCHEDULES - QUICK REFERENCE CHART	
Type of Aircraft and Operation	Content and Interval
Commercial and Non-commercial <ul style="list-style-type: none"> • Large aeroplanes and helicopters operated by flight training units. • Large aircraft operated under CAR Part VII. • Pressurized turbine-powered aircraft. • Airships. • Other large aircraft. 	<ul style="list-style-type: none"> • Program approved for operator in accordance with Appendix D. • Must include the applicable items of Appendix C.

(5) The depth of inspection of each item on the schedule shall be determined by the person performing the inspection, and shall be consistent with the general condition and operating role of the aircraft.

(6) Pursuant to CAR 605.86(2), the schedule is considered to be approved for use by owners of small non-commercial operation aircraft and all balloons. Owners need only to make an entry in the aircraft technical records that the aircraft is maintained pursuant to the maintenance schedule.

(7) Pursuant to CAR 605.86(2), the maintenance schedule can be used as the basis for a commercial air operator's maintenance schedule. With the exception of a balloon inspection schedule, commercial air operator's maintenance schedules based on this document are subject to approval by the Minister in accordance with Appendix D. Schedules for aircraft operated in commercial air service (including balloons pursuant to CAR) shall include an inspection of the items listed in Part I or II of this appendix, as applicable, and the accomplishment of out of phase tasks and equipment maintenance requirements specified in Appendix C.

(8) Pursuant to CAR 605.86(2), where the aircraft utilization is sufficient to ensure that all items listed in Parts I or II of this appendix are performed within a 12 month period, an owner can request that inspections under this maintenance schedule be performed progressively. In this case, a revised maintenance schedule shall be submitted for the Minister's approval in accordance with the procedures outlined in subsection 625.86(2) of these standards.

(9) Pursuant to CAR 605.86(2), where a flight training unit operating aeroplanes and helicopters pursuant to CAR 406 chooses to use Part I of this appendix as a basis for inspections to be carried out at 100 hour intervals, it must be approved in accordance with the procedures outlined in Appendix D of these standards.

(10) This maintenance schedule is not an inspection checklist. Prior to performing the inspections tabled herein, an appropriate checklist containing these requirements must be developed.

Information Notes:

(i) Many aircraft manufacturers produce detailed inspection checklists. In many cases the location of system components is clearly identified on those documents. In the interest of efficiency an owner may wish to use a manufacturers checklist in order to accomplish this inspection. Manufacturer's checklists may be used, provided they include at least the items

listed in Part I or Part II of this appendix, as applicable. Where an owner has chosen to use a manufacturer's checklist, it should be clearly marked to indicate that the check is following the general maintenance schedule. In addition, any references in those checklists concerning compliance with Airworthiness Directives must be stricken out as not applicable, as it is the owner's responsibility to advise the AME of any outstanding Airworthiness Directives or airworthiness limitations.

(ii) Large aircraft comply with a detailed maintenance schedule as per Appendices C and D of these standards.

Part I - Scheduled Inspections for Small Aircraft other than Balloons

At intervals prescribed in the General Procedures to this appendix, inspect the aircraft as follows:

(1) Aircraft Generally

- (a) Remove or open all necessary inspection plates, access doors, fairings and cowlings. Thoroughly clean the aircraft and engine.*
- (b) Inspect panel, door and cowl closing and locking mechanisms for improper installation and function.*
- (c) Lubricate in accordance with the manufacturer's recommendations.*

(2) Fuselage and Hull Group

- (a) Structure - inspect for deterioration, distortion, evidence of failure and defective or insecure attachment of fittings.*
- (b) Systems and components - inspect for improper installation, apparent defects and unsatisfactory operation.*

(3) Cabin and Cockpit Group

- (a) Generally - inspect for dirt and loose equipment that might foul the controls;*
 - (b) Seats and safety belts - inspect for poor condition, fraying, and any other apparent defects;*
 - (c) Windows and windshields - inspect for deterioration and breakage;*
 - (d) Instruments - inspect for poor condition, mounting, marking and, where practicable, for improper operation;*
 - (e) Flight and engine controls - inspect for improper installation and improper operation;*
 - (f) Batteries - inspect for improper installation and improper charge;*
 - (g) All systems - inspect for improper installation, poor general condition, apparent and obvious defects and insecurity of attachment.*
 - (h) Placards - inspect for missing and illegible mandatory placards.*
- (amended 2002/06/01)

(4) Engine and Nacelle Group

- (a) Leaks - inspect for oil, fuel or hydraulic leaks;
- (b) Studs and nuts - inspect for defects, evidence of improper torque and safety locking;
- (c) Cylinder compression - check; if compression test indicates problems, check internal condition and tolerances;
- (d) Screens and sump drain plugs - check for metal particles or foreign matter;
- (e) Engine mounts - inspect for cracks, looseness of mounting and looseness of engine to mount;
- (f) Flexible vibration dampeners - inspect for poor condition and deterioration;
- (g) Engine controls - inspect for defects, improper travel and improper safety locking;
- (h) Lines, hoses and clamps - inspect for leaks, improper condition and looseness;
- (i) Exhaust stacks - inspect for cracks, defects and improper attachment;
- (j) Accessories - inspect for apparent defects in security of mounting;
- (k) All systems - inspect for improper installation, poor general condition, defects and insecure attachment;
- (l) Cowlings - inspect for cracks and other defects.
- (m) Internal corrosion - inspect engines which have not been inhibited and have been out of service in excess of 12 months.
- (n) Engine performance - during the ground run, run the engine in accordance with the manufacturer's recommendation to determine satisfactory performance of the following:
 - (i) idle and maximum RPM;
 - (ii) magneto RPM drop;
 - (iii) fuel and oil pressures;
 - (iv) cylinder and oil temperatures.
- (o) Engines maintained to an On-condition program - check reference RPM.

(5) Landing Gear Group

- (a) All units - inspect for condition and security of attachment;
- (b) Shock absorbing devices - check oleo fluid level;
- (c) Linkage, trusses and members - inspect for undue or excessive wear, fatigue and distortion;
- (d) Retracting and locking mechanism - inspect for improper operation;
- (e) Hydraulic lines - inspect for leakage;
- (f) Electrical system - inspect for chafing and improper operation of switches;

- (g) Wheels - inspect for cracks, defects and condition of bearings;
- (h) Tires - inspect for wear, cuts and incorrect inflation; inspect for improper installation and improper operation.
- (i) Brakes - inspect for improper adjustment;
- (j) Floats and skis - inspect for insecure attachment and apparent defects;

(6) Wing and Centre Section Assembly

Inspect structure for general condition, deterioration, distortion, evidence of failure and insecurity of attachment.

(7) Empennage Assembly

Inspect structure for general condition, deterioration, distortion, evidence of failure, insecure attachment, improper component installation and improper component operation.

(8) Propeller Group

- (a) Propeller hub assembly - inspect for cracks, nicks, binding and oil leakage;
(amended 2000/12/01)
- (b) Bolts and nuts - inspect for improper torque and safety locking;
(amended 2000/12/01)
- (c) Anti-icing devices - inspect for improper operation and defects, paying particular attention to:
(amended 2000/12/01)
 - (i) deicer boots for cuts, gouges and adherence,
(amended 2000/12/01)
 - (ii) slip ring for excessive wear and gouges, and
(amended 2000/12/01)
 - (iii) connections and harness for tightness;
(amended 2000/12/01)
- (d) Control mechanisms - inspect for improper operation, insecure mounting and improper range of travel;

**(e) Metal blades - inspect for
(amended 2007/12/30)**

- (i) cracks, nicks, external corrosion, dents, scratches, bends, erosion and loss of protective finish,
(amended 2007/12/30)
- (ii) evidence of lightning or object strike, and
(amended 2000/12/01)
- (iii) correct track, excessive rotational and end play;
(amended 2000/12/01)

**(f) Wooden and composite blades – inspect for:
(amended 2007/12/30)**

(i) cracks, bruises, scars, warping, evidence of glue failure and delamination,
(amended 2007/12/30)

(ii) correct track, excessive rotational and end play, and
(amended 2007/12/30)

(iii) attachment bolt tightness;
(amended 2007/12/30)

(g) Spinner assembly - inspect for cracks and wear;
(amended 2007/12/30)

(h) Variable pitch propellers — check correct operation during ground run.
(amended 2007/12/30)

Information Notes:

(amended 2007/12/30)

(i) While not specifically required by this schedule, a check of the propeller's dynamic balance at the annual inspection is strongly recommended. Vibration due to imbalance can be hard to detect without instruments, but may nevertheless be causing problems throughout the aircraft, including to the propeller itself. With proper equipment, dynamic imbalance is simple both to detect and to correct.

(amended 2007/12/30)

(ii) Propeller condition is greatly affected by environmental conditions. Ideally, the aircraft should be parked in a clean, dry location. If it is to be out of use and parked out of doors for an extended period, it is worthwhile removing the propeller and storing it inside. Failing this, the use of a propeller cover, or simply turning the blades of a twin bladed variable pitch propeller to the horizontal position, will reduce the ingress of moisture to the blade bearings and extend their potential life. Other simple actions that can extend the life of the propeller include regular cleaning, the application of wax polish, and the use of protective tape on the leading edges. (If tape is used, care should be taken not to apply it where it could be ingested into the engine if it becomes detached.)

(amended 2007/12/30)

(9) Radio Group

(a) Radio and electronic equipment - inspect for improper installation and insecure mounting.

(b) Emergency Locator Transmitters - test performance in accordance with the procedure specified in Appendix G of Chapter 571 of the *Airworthiness Manual*.

(c) Wiring and conduits - inspect for improper routing, insecure mounting and apparent defects.

(d) Bonding and shielding - inspect for improper installation and poor condition.

(e) Antennas, including trailing antennas - inspect for poor condition, insecure mounting and improper operation.

(10) Miscellaneous Items Not Otherwise Covered by this Listing

(11) Aircraft Generally, Including Technical Records

(a) Enter details of all deficiencies found during the inspection in the aircraft technical records;

(b) Upon completion of the inspection, replace or close all inspection plates, access doors, spinners, fairings and cowlings.

(amended 2000/12/01)

Part II - Scheduled Inspections for Balloons

(1) At intervals prescribed in the General Procedures, inspect the:

(a) envelope;

(b) basket (gondola) and its attachments;

(c) load tapes and support lines;

(d) instruments;

(e) controls;

(f) burners;

(g) fuel tanks, hoses and clamps; and

(h) radios and other installed equipment.

(2) Where the check list used differs from the manufacturer's recommended check list, the list shall be approved by the Minister.

(3) Where the balloon is a foreign registered balloon operating in accordance with an authorization issued by the Minister pursuant to CAR 603, it shall be inspected and maintained in accordance with a program which complies with the requirements of this appendix.

APPENDIX C - OUT OF PHASE TASKS AND EQUIPMENT MAINTENANCE REQUIREMENTS

(1) This appendix lists the maintenance requirements for specific equipment. Unless otherwise specified, these intervals apply to all installed equipment of a type listed herein.

(2) In the case of operators having maintenance schedules approved in accordance with Appendix D, the intervals specified in this appendix are initial intervals that must be used by a new operator of the type. They may be amended once experience on that type has been gained, based on the results of the owner's maintenance monitoring program. These operators may also be authorized to deviate from the interval specified in this appendix, if they can demonstrate that the requirement as written does not apply, due to the design of the installed equipment.

(amended 2007/12/30)

(3) Nothing in these standards relieves the owner from the responsibility for determining the applicability of these requirements to his/her aircraft, or for identifying any other maintenance requirements relating to equipment not listed here.

Information Note:

Where doubt exists as to the compliance requirements in respect of a specific aircraft installation, the owner can contact the nearest Transport Canada district or regional office for assistance.

Operators with an approved maintenance schedule may obtain approval to deviate from the standard where acceptable documentation can be provided to Transport Canada.

(amended 1998/09/01)

Out of Phase Task Listings

Carry out the following tasks at the times indicated:

1. All Aircraft

Ensure that any applicable equipment maintenance task required by this appendix is performed at, or before, the next inspection interval listed therein.

2. Aircraft Used in Dual Role Operations

Upon conversion between roles, inspect to ensure that contamination, structural damage and other defects incurred during operation in the special purpose role, are rectified prior to operation in the normal role.

3. Rotorcraft Dynamic Components

At the intervals recommended by the aircraft manufacturer, inspect, overhaul or test:
(amended 1999/09/01)

(a) the drive shafts or similar systems;

(b) the main rotor transmission gearboxes;

(c) the main rotors and hubs; and

(amended 1999/09/01)

(d) the tail rotor.

4. Propellers General

(amended 2007/12/30)

For the purposes of this appendix, the following definitions apply:
(amended 2007/12/30)

“double acting propeller” - A variable pitch propeller, the blade angles of which can be varied in either direction (increase or decrease) by direct control input from the pilot, or from an automatic mechanism, includes those propellers such as the "Hydromatic" models, in which governor oil pressure is opposed by engine oil pressure.

(amended 2007/12/30)

“fixed pitch propeller” - A propeller, the blade angles of which cannot be altered in service.

(amended 2007/12/30)

“ground adjustable propeller” - A propeller, the blade angles of which cannot be varied in flight, but are capable of being adjusted on the ground.

(amended 2007/12/30)

“single acting propeller” - A variable pitch propeller, the blade angles of which can be varied by the application of control input in one direction only (either increase or decrease), the opposing force being provided by counterweights, springs, or air pressure.

(amended 2007/12/30)

“variable pitch (VP) propeller” - A propeller, the blade angles of which can be varied in flight, either by direct selection, or by the action of an automatic mechanism.

(amended 2007/12/30)

5. Variable Pitch Propellers

(amended 2007/12/30)

Except for aircraft that are operated under a special certificate of airworthiness in the owner-maintenance or amateur-built classification, all variable pitch propellers shall be overhauled at the following intervals:

(amended 2007/12/30)

(a) Where the manufacturer has made recommendations regarding the air time between overhauls, overhaul at the interval recommended or every ten years, whichever comes first;
(amended 2000/12/01)

(b) Where the manufacturer has not made any recommendations regarding the air time between overhauls, overhaul at the following intervals:
(amended 2000/12/01)

(i) in the case of propellers installed on turbine engines: 2,000 hours air time or ten years, whichever comes first;
(amended 2000/12/01)

(ii) in the case of double acting propellers installed on piston engines: 2,000 hours air time or ten years, whichever comes first; or
(amended 2000/12/01)

- (iii) in the case of single acting propellers installed on piston engines: 1,500 hours air time or ten years, whichever comes first.
(amended 2000/12/01)

Information Note:

The ten year overhaul intervals mentioned in (a) and (b), start either from its initial date of installation following manufacture, from its last five year corrosion inspection or its last overhaul, whichever occurred last.

(amended 2000/12/01)

6. Fixed Pitch and Ground Adjustable Propellers

(a) Fixed pitch wooden propellers shall be checked for tightness after the first 25 hours of air time following their installation and at each subsequent inspection.

(amended 2007/12/30)

(b) At intervals of not more than 5 years, the propeller shall be removed from the aircraft and inspected for corrosion or other defects over its entire surface, including the hub faces and the mounting hole bores. While the propeller is removed, it shall also be checked for correct dimensions. However, if defects which require repairs beyond those recommended as field repairs by the propeller manufacturer are found, the propeller shall be repaired by an organization approved for the overhaul of propellers.

(amended 2007/12/30)

Information Note: *The dimensional check requirement does not include a check on blade twist. The dimensional check refers to changes in blade dimension resulting from repairs, particularly cropping of the tips. It is intended to ensure that the blade diameter remains within service limits.*

(amended 1998/09/01)

7. Engines

All piston and turbine engines installed in aeroplanes and helicopters operated pursuant to CAR 406, in large aircraft operated pursuant to CAR 604, and in aircraft operated pursuant to Part VII, shall be overhauled at the intervals recommended by the engine manufacturer, or in accordance with an alternative hard time interval or an engine on-condition maintenance program approved in accordance with Appendix D.

Information Note:

No hard time, including calendar time, between overhauls need be observed in the case of small aircraft reciprocating engines in non-commercial private operation.

8. Tachometers

The accuracy of mechanical drag cup type tachometers, for fixed wing propeller driven aircraft, shall be checked on site annually, and be accurate to within the tolerances established by the aircraft manufacturer or, where no tolerance has been specified by the aircraft manufacturer, to within $\pm 4\%$ of engine RPM at mid-point of the cruise range.

(amended 2000/12/01)

9. Weight and Balance

Except as provided for in an approved fleet empty weight and balance control program, all large aircraft shall be reweighed and an updated report prepared every five years.

10. Non-stabilized Magnetic Direction Indicators (MDIs)

(a) Except as provided in (b), and (c), non-stabilized magnetic direction indicators shall be calibrated, and a dated correction card installed for each indicator, at intervals not exceeding 12 months;

(b) The annual calibration requirement of (a) does not apply to an aircraft operating under an air operator certificate, or to any large or turbine-powered pressurized aircraft, where:

(i) the aircraft is equipped with two independent stabilized magnetic direction indicators in addition to the non-stabilized direct reading magnetic direction indicator; and

(ii) a procedure for monitoring and recording the performance of the magnetic direction-indicators is detailed in the flight training unit's, or in the air operator's approved maintenance control manual approved pursuant to CAR 406 and CAR 706 respectively.

(c) The calibration requirement of (a)(i) can be postponed, for the purpose of flights commencing or terminating within the area of compass unreliability, as defined in the *Designated Airspace Handbook* (TP 1820), or any of a series of flights conducted within a period of seven consecutive days, where the series commences within the area of compass unreliability.

11. Survival and Emergency Equipment

Survival and emergency equipment shall be overhauled at the intervals recommended by the manufacturer.

12. Emergency Locator Transmitters (ELTs)

(a) Except where powered by water activated batteries, the ELT shall be inspected at intervals not exceeding 12 months, in accordance with Standard 571 of the CARs.
(amended 2007/12/30)

(b) In the case of ELTs powered by water activated batteries, the performance testing required by Appendix G of Standard 571 of the CARs shall be carried out at intervals not exceeding 5 years.
(amended 2007/12/30)

(c) ELT batteries shall be replaced at the interval recommended by the ELT manufacturer.

13. Altimetry Devices

(amended 1998/09/01)

(a) Altimeters and other Altimetry devices installed in aircraft operating under Instrument Flight Rules, or under visual flight rules in Class B and C Airspace or Class C and D Airspace that is designated as "Transponder Airspace" shall be calibrated at intervals not exceeding 24 months, to the parameters and tolerances outlined in Appendix B of Standard 571, or to equivalent standards acceptable to the Minister.
(amended 2007/12/30)

(b) For the purpose of this section, the term "altimetry devices" includes any air data computer, or other barometric device, providing a flight crew station, or an auto pilot, or automatic pressure altitude reporting system, or altitude alerting system with altitude data derived from static pressure.

(amended 2007/12/30)

14. Air Traffic Control (ATC) Transponders

ATC Transponders, including any associated altitude sensing reporting mechanisms, where installed, shall be tested every 24 months, in accordance with Appendix F of Chapter 571 of the *Airworthiness Manual*.

(amended 2000/12/01)

15. Cockpit Voice Recorders (CVRs)

(a) Cockpit Voice Recorders (CVR), where installed for compliance with the basis of certification listed on the type certificate, or where required by operating rule, shall be subject to the following maintenance, in accordance with a maintenance schedule meeting the following requirements:

- (i) an operational check;
- (ii) a functional check;
- (iii) an intelligibility check; and
- (iv) unit overhaul, at the interval recommended by the CVR manufacturer.

(b) An operational check shall be performed, in accordance with the manufacturers instructions, as follows:

- (i) by maintenance personnel during each line check and following any system maintenance;
- (ii) by each new, or partial change of, flight crew; and
- (iii) upon installation in the aircraft.

(c) A functional check shall be completed in accordance with manufacturers maintenance instructions at 3,000 hours, or 12 months, whichever comes first.

(d) An intelligibility check shall be performed by means of a test procedure which, when completed under operational conditions, shall enable verification of intelligible recorded audio information from all the various input sources required by the regulations:

- (i) upon initial installation;
- (ii) at every 3,000 hours, or 12 months, whichever comes first.

(amended 2007/12/30)

(e) CVR maintenance and overhaul shall be performed in accordance with manufacturer's recommendations.

(amended 1998/09/01)

Information Note:

(amended 1998/09/01)

EUROCAE ED-56 (refer to its latest revision) document provides guidelines for CVR maintenance in general; it also provides information relative to equipment required to adequately evaluate the quality of voice recording.

(amended 2007/12/30)

Copies of ED56 may be obtained from:

(amended 2007/12/30)

EUROCAE, 11 rue Hamelin 75783 Paris CEDEX 16, France

(amended 2000/12/01)

16. Underwater Locating Devices (ULDs)

(a) The beacon case and water switch shall be cleaned at the interval specified by the ULD manufacturers' recommendations.

(amended 1998/09/01)

(b) Operational checks shall be conducted on ULDs upon installation, and once a year thereafter. The ULD battery shall be replaced on or before the expiry date stamped on the battery, and a label affixed to the ULD case indicating the next replacement date.

(c) The ULD shall be inspected and tested at the intervals specified below:

(amended 1998/09/01)

(i) cleaning of the water switch at interval as recommended by the ULD manufacturer;

(ii) recertification of the ULD at 12 month intervals; and

(iii) replacement of the ULD battery at the interval as recommended by the battery manufacturer.

17. Flight Data Recorders (FDRs)

(amended 2007/12/30)

Information Notes

(i) Operators with an approved maintenance schedule may obtain approval to deviate from the standard where acceptable documentation can be provided to Transport Canada.

(amended 1998/09/01)

(ii) *EUROCAE ED-55 (refer to its latest revision) document provides guidelines for FDR maintenance.*

(amended 2007/12/30)

Copies of ED-55 may be obtained from:

(amended 2007/12/30)

EUROCAE, 11 rue Hamelin 75783 Paris CEDEX 16, France

(amended 2007/12/30)

FDR MAINTENANCE SCHEDULE	
Task	Interval
Correlation check to ensure all required parameters are being recorded and usable	3,000 flight hours or 12 months, whichever occurs first
Accelerometer functional check	As specified by the FDR manufacturer (amended 1998/09/01)
Overhaul FDR	As specified by the FDR manufacturer (amended 1998/09/01)
Cleaning of heads	As specified by the FDR manufacturer (amended 1998/09/01)

18. Fuel Tank System Safety

(amended 2007/12/30)

The maintenance schedule of turbine-powered transport category aeroplanes shall include provisions for the inspection of aeroplane fuel tanks and related systems, necessary to maintain the design features required to preclude the existence or development of an ignition source within the fuel tank system.

(amended 2007/12/30)

Information Notes:

(amended 2007/12/30)

(i) The fuel tank system safety inspection instructions could consist of Instructions for Continued Airworthiness (ICA) recommendations developed by the holders of design approvals, mandated by the basis for certification of the design and any other requirement such as FAA SFAR 88.

(amended 2007/12/30)

(ii) Maintenance schedules should be tailored to include inspection and maintenance criteria for each specific aeroplane configuration, addressing modifications or repairs that may affect fuel tank system safety.

(amended 2007/12/30)

APPENDIX D - OPERATOR'S APPROVED MAINTENANCE SCHEDULE

(1) Pursuant to CAR 605.86(2), applications for approval of maintenance schedules shall be submitted to the Minister through the Transport Canada regional or district office having jurisdiction over the area in which the applicant is located.

(2) Pursuant to CAR 605.86(1), an air operator's approved maintenance schedule shall ensure that the maintenance requirements listed in Appendix C are complied with.

(3) Pursuant to CAR 605.86(1), the following information shall accompany an application for approval of a maintenance schedule:

(a) The instructions and procedures for the conduct of scheduled maintenance on the particular make and model of aircraft, provided in the form of a check list, including the following information:

(amended 1998/09/01)

(i) the name of any part or areas of the airframe, engines, propellers, appliances, and emergency equipment to be inspected or otherwise maintained;

(ii) the nature of the inspections or other maintenance tasks to be performed;

(iii) an outline of the proposed intervals for performing the inspections or other maintenance tasks, expressed in flying hours, calendar time, or cycles;

(iv) any tolerances applicable to the intervals between scheduled inspections or maintenance tasks;

Information Note:

No tolerances are permitted with respect to tasks recognized by airworthiness limitations or airworthiness directives.

(v) where the maintenance of any part or areas of the airframe, engines, propellers, appliances, or emergency equipment is required because that part or area of the airframe, engines, propellers, appliances, or emergency equipment is subject to an airworthiness limitation, its identification as such; and

(vi) in the case of schedules approved in respect of air operators and flight training units that develop work instructions for maintenance personnel to be used in place of the manufacturer's maintenance manuals, a link to those work instructions.

(amended 1998/09/01)

(b) Details of the substantiating data on which the proposed schedule is based.

(4) Pursuant to CAR 605.86(2), an operator of a small aircraft who wishes to use a progressive maintenance schedule, including a schedule recommended by the manufacturer, shall submit a written request for approval to the Minister. The progressive maintenance schedule shall provide for a complete inspection of the aircraft, to at least the same extent as the schedule contained in Appendix B, within each 12 month period. Once established on such a progressive schedule, if for any reason, the qualifying terms of the schedule cannot be met, the aircraft shall undergo an inspection for conversion to the schedule required by Appendix B of these standards. Such inspection shall not be less in scope than the inspection detailed in

Parts I or II of Appendix B of these standards.
(amended 1998/09/01)

Information Note:

For guidance and forms respecting Maintenance Schedules, refer to the Maintenance Schedule Approval Policy and Procedures Manual (TP13094).
(amended 1998/09/01)

**APPENDIX E - MAINTENANCE
INSTRUCTION DEVELOPMENT PROCESSES**
(amended 2007/12/30)

Information Notes:

(amended 1998/09/01)

(i) The existing Airworthiness Manual Advisory AMA 571.101/1 - Reliability Monitoring Programs, is still in effect.

(ii) For information regarding the type certificate holder's scheduled maintenance instruction development processes including the Maintenance Review Board (MRB) process, the Maintenance Type Board (MTB) process and the development of Manufacturer Recommendations (MR) please refer to Transport Canada Publication TP 13850 titled Maintenance Instruction Development Processes. This publication provides policy on an acceptable means to implement the scheduled maintenance instruction development process including the procedural guidelines, the acceptable analytical logic that is utilized during the initial developmental process and criteria for the continuing analysis and age exploration of the aircraft fleet.

(amended 2007/12/30)

Reserved

APPENDIX F - TRANSFER OF AERONAUTICAL PRODUCTS BETWEEN MAINTENANCE SCHEDULES

(1) General

Background Maintenance schedules are approved for the use of particular operators, and take into account the operators' individual circumstances and demonstrated reliability. They are not interchangeable between operators. Scheduled maintenance requirements for aeronautical products may also vary within the fleet of a single operator, according to the type of aircraft on which they are installed, or the role in which they are operated. When aeronautical products (either complete aircraft or components) are transferred between inspection programs, it is the responsibility of the operator (where two operators are involved the responsibility is that of the new operator) to review the maintenance status of the products to establish them on the new program.

(2) Review

The review procedure consists of a comparison of the content of the previous inspection program with that of the new program. If the programs are found to be identical, no further action is required. Any differences between the two programs will require either a recalculation of the times remaining to the maintenance task(s) involved, an out of phase inspection of the product, or both, as explained in the following paragraphs.

(3) Differences

Differences between the two inspection programs will fall under one of the following methods or headings:

- (a) tasks which appear on both programs, but at different intervals;
- (b) tasks which appear on both programs, but use different accomplishment
- (c) tasks which appear on one program but not on the other.

(4) The procedure for calculating the times remaining to overhaul, or other maintenance tasks(s) for those items having different intervals on the new program, is given in section 12.

Information Notes:

(i) As detailed in 625.87(2) of these standards, provided that a flight training unit or an air operator's approved maintenance control manual contains procedures for the use of borrowed parts, they can borrow an aircraft part from another person and can use such part for a maximum of 100 hours, or 90 days, whichever is greater, without compliance to the requirements in this appendix, even though the time in service of such part exceeds the borrower's approved inspection intervals.

(ii) As specified in 625.93(1) of these standards, the "time" referred to when calculating time between maintenance activities is considered the actual air time.

(5) Both Program Tasks

Where a task appears on both programs, but the task uses different accomplishment methods, calculation to the new program interval is not permitted, unless the document which requires the inclusion of that task into the maintenance schedule is consulted to ensure methodology does not affect interval. Where the interval is based on methodology, the task will be accomplished at the interval appropriate to the methodology used in the new program.

(6) Old Program Tasks

Tasks which form part of the old program but not the new must normally be performed one final time before being eliminated totally by the new program. The tasks may be performed either at the time of transfer or at some later convenient time, provided that the approved interval (of the previous program) is not exceeded (i.e. time remaining to task will be the same on both programs). In some circumstances Transport Canada can, upon application, waive the requirement to perform tasks in this category. Such a waiver would be appropriate in the case of tasks introduced because of a specialized operating role, when the aircraft had operated in that role for only a small proportion of the approved interval. It would not, however, be appropriate in the case of tasks introduced in response to problems which could result from short term exposure to risks. For example, if an underfloor inspection has been included in a program to cater for the carriage of cattle, then use in that role for even a single occasion will necessitate the performance of the inspection.

(7) New Program Tasks

Tasks which are required by the new program, but do not appear on the old, can be performed at the completion of the appropriate interval, commencing at the time of transfer (i.e. time remaining to task and approved interval will be identical).

(8) Airworthiness Limitations

The prorating procedures described in section (4) above do not apply to items designated in the type approval document as “airworthiness limitations”, or “life limits”. This will not normally be a problem, since such limitations apply equally to all operators. Certain life-limited items, however, can have different limits depending on the installation or the aircraft role. Because of the critical nature of parts subject to life limits or other airworthiness limitations, when transferring identical life-limited products between programs to which different limits apply, the lower limit shall be observed, irrespective of whether that limit forms part of the old or the new program, unless written approval for some other procedure is obtained from the Director, Aircraft Certification.

Information Note:

The new operator shall perform an acceptance inspection at the time of transfer. This inspection shall confirm that the aircraft or component is in compliance with airworthiness directives and other mandatory requirements, and provide an opportunity to perform those tasks required by one program only, or those tasks required at such frequent intervals that prorating would be inconvenient. In cases where the transfer involves a complete change of program format (e.g. from a “block” to an “equalized” program, or vice-versa) the

acceptance inspection can be performed in a number of stages over a period of operation time, to provide the necessary "stagger" for future task performance.

(9) Records

At the time of transfer, the new operator shall make entries in the appropriate sections of the technical records recording any recalculations which have been made. For example, a typical engine log entry might read:

"Engine acquired by ABC Airlines 15/2/86. Previous TBO (XYZ Airlines) 5,500 hrs. Time since overhaul at transfer 3,086 hrs. ABC Airlines approved TBO 4,500 hrs. Prorated time remaining = 1975 hrs: Overhaul at 5061 hrs."

(10) Subsequent Transfers

If, after prorating and a period of operation on the new program, a subsequent transfer occurs, either to a third program or back to the original program (as would occur on the termination of a lease, for example) the procedure shall be repeated. If further calculations are required, value Y (see section (12) below) shall be taken as the time(s) remaining to task at the time of transfer, irrespective of the actual hours flown or the previous calculations made. The details of previous calculations are not required, since only the time remaining is being adjusted. The principle involved is that the time remaining to overhaul shall be a direct indication of the unused service life potential of the component.

(11) Differences in Build Standard

The procedure required by paragraph (12) is intended for transfers between programs which have been approved for use with identical products. Where the programs have been developed for products having significant differences in build standard, no upward adjustment of the times remaining to overhaul is permitted without specific Transport Canada approval. "Significant" differences are any differences in material specification, dimensions or tolerances, or any differences in modification standard which could affect the potential TBO.

Information Note

As an example, most engine structural modifications (Air Transport Association (ATA) Chapter 72 dealing with Engine-Turbine/Turboprops) would fall into this category. Operators who are bringing into use products with build standards different to those for which the inspection program was developed, and who wish to adjust the times remaining to overhaul upwards, shall list the differences and forward them to the Principal Maintenance Inspector (PMI) or equivalent Transport Canada department representative, together with the prorating calculations, and their assessment of the effect of the build standard differences on the times remaining to overhaul. Transport Canada will assess the proposals, and notify the operator of the maximum time(s) which can be permitted to elapse before the task(s) are performed.

(12) Calculations

The procedure for calculating the times remaining to overhaul or other maintenance tasks(s) for those items having different intervals on the new program is known as “prorating.” It is based on the following formula:

$$X = Y \times \frac{a}{b} \text{ where:}$$

X = time remaining to task on the new program;

Y = time remaining to task on the previous program;

a = interval between tasks on the new program; and

b = interval between tasks on the previous program.

The following examples will illustrate the use of this formula. Note that the approved intervals (TBOs) of the respective programs are unaffected. It is the times remaining to the task(s) which are recalculated.

For the purpose of these calculations, all times can be rounded out to the nearest hour or, in the case of calendar times, to the nearest complete month.

Example 1

An aircraft is transferred (by sale or lease) between two operators. The first operator’s inspection program requires an overhaul of the flap actuator gear boxes at 10,000 hrs. The new operator (who has a short haul route structure requiring more frequent flap extensions) is approved for a TBO of 5,000 hrs. The No. 1 flap gear box has been in service for 6,000 hrs.

Time remaining to task on the previous program (Y) = 10,000 - 6,000 = 4,000 hrs.

Interval between tasks on new program (a) = 5,000 hrs.

Interval between tasks on previous program (b) = 10,000 hrs.

$$\text{Time remaining to overhaul (X)} = Y \times \frac{a}{b} = 4,000 \times \frac{5,000}{10,000} = 2,000 \text{ hrs}$$

Example 2

An operator has a DC-3 and a Canso and keeps one spare engine for use in both aircraft. Approved TBO in the DC-3 installation is 1,000 hrs. Approved TBO in the Canso installation is 800 hrs. The spare engine is required for use in the DC-3 and has 650 hrs since overhaul, acquired while installed in the Canso.

Time remaining to overhaul in the DC-3 installation (X) will be:

$$150 \times \frac{1,000}{800} \quad \text{Rounded to nearest complete hour} = 188 \text{ hrs.}$$

Example 3

An operator having an approved time between “C” checks of 2,500 hrs., obtains an aircraft from an operator having an approved time between “C” checks of 3,000 hrs. Time since last

“C” check is 2,150 hrs. A comparison of the two “C” check packages shows the check content to be the same in both cases.

$$Y = 3,000 - 2,150 = 850$$

$$\text{Time remaining to “C” check on new program (X)} = 850 \times \frac{2,500}{3,000} = 708 \text{ hrs.}$$

Where differences exist between the contents of the two check packages, the operator can elect to calculate the times remaining to each of the items involved as a separate task, to be performed out of phase with the rest of the check cycle, or to treat the items in accordance with paragraph (6) above, as appropriate.

Where the two inspection programs are based on different units (e.g. flying hrs., operating cycles or calendar time) all intervals and times remaining to tasks shall be converted to the units used by the new operator prior to prorating. This conversion should be done, where possible, according to the conversion factor expressed in the previous operator’s program. Where no such factor exists, the conversion shall be based on the actual experience of the previous operator, as shown in the following example:

Example 4

An operator having an approved time between “C” checks of 12 months, obtains an aircraft from an operator having an approved time between “C” checks of 3,000 hrs. Aircraft time since last “C” check is 2,150 hrs.

Step 1. (Convert to calendar times)

Previous operator’s utilization (past 12 months) = 2,365 hrs.

$$\text{Therefore monthly utilization} = \frac{2,365}{12} = 197 \text{ (rounded)}$$

$$\text{Approved “C” check interval in calendar time} = \frac{\text{interval in hrs}}{\text{monthly utilization}} = \frac{3,000}{197} = 15 \text{ mths (rounded)}$$

$$\text{Time remaining to check in calendar time} = \frac{\text{time in hours}}{\text{monthly utilization}} = \frac{850}{197} = 4 \text{ mths (rounded)}$$

Step 2. (prorate)

$$\text{New operator’s time remaining to “C” check} = 4 \times \frac{12}{15} = 3 \text{ mths (rounded)}$$

APPENDIX G - INSPECTION AFTER ABNORMAL OCCURRENCES

(1) Pursuant to Section 571.02, in the *Canadian Aviation Regulations* all maintenance shall be performed using the methods, techniques, practices, parts, materials, tools, equipment, and test apparatus specified by the manufacturer of the aeronautical product.

Information Note:

This appendix details the requirements for the inspection of aircraft after abnormal occurrences and gives general advice on the performance of such inspections.

(2) Aircraft are approved to operate within certain limits which are considered to constitute normal operation. If these limits are exceeded due to abnormal occurrences, or if the aircraft is exposed to some hazard or stress which was not catered for in the original design, the integrity of the structure or the performance of the powerplant(s) or systems could be impaired. Any report or evidence which indicates that approved limits have been exceeded, or that the aircraft may have sustained damage, shall necessitate an inspection to ensure that the aircraft is still airworthy. The following sections outline in general terms the inspections required after some of the more common occurrences. The procedures described are intended to supplement manufacturer's recommendations, or to cater for those instances where the manufacturer has not provided any detailed instructions. In case of any conflict, the manufacturer's instructions shall prevail. The procedures described are not intended to be complete, or to cover all circumstances. It is the responsibility of the person performing the inspection to assess the circumstances of each case and decide on the appropriate course of action. In doubtful cases, the nearest Transport Canada regional or district office can be consulted.

(3) The inspections detailed in this appendix shall usually be performed by a person who may sign a maintenance release in accordance with section 571.11 of the CARs. In some cases, the nature of the work will be such that the involvement of an AME will be mandatory. This would be the case, for example, where some degree of disassembly was required. It is not possible, however, to state that a person specified in section 571.11 of the CARs is required in all cases. Often, at the time of the occurrence, only the pilot of the aircraft is able to assess the severity of the incident or is available to decide the course of action. Some manufacturers recognize this by allowing for the inspection to be performed in two stages. To cater for situations where no person specified in section 571.11 of the CARs is available, the following procedure is recommended.

(amended 2007/12/30)

(4) Following any abnormal occurrence, including but not limited to those described in this appendix, an entry shall be made in the journey log describing the event. Where possible, the entry shall include some indication of the relative severity of the incident. Prior to the next flight, the aircraft shall be inspected, preferably by a person who may sign a maintenance release in accordance with section 571.11 of the CARs. If no such person is available, the inspection can be conducted by the captain of the aircraft. In this case, the inspection will of necessity be limited to those items which do not require a maintenance release (i.e. does not

involve disassembly).
(amended 2007/12/30)

(5) If in the opinion of the captain, the condition of the aircraft is satisfactory for the intended flight, albeit without passengers, he/she shall make an entry in the log to that effect calling for a full inspection by a person who may sign a maintenance release in accordance with section 571.11 of the CARs when available. The captain can then proceed, at his/her discretion, on the intended flight(s) until such time as the aircraft reaches a base where the required additional inspection can be performed. No special flight authority is required under these circumstances. At the first opportunity, the aircraft shall be inspected and a maintenance release shall be issued by a person who may do so in accordance with section 571.11 of the CARs.

(amended 2007/12/30)

(6) If in the opinion of the captain, the aircraft is unairworthy, or if the severity of the incident was such that even after a satisfactory preliminary inspection its airworthiness is in doubt, then the aircraft shall be inspected by a person specified in section 571.11 of the CARs, and a maintenance release signed, before further flight.

(amended 2007/12/30)

(7) In the following sections, no attempt is made to differentiate between those actions which may be part of a pilot's preliminary inspection, and those which must be performed by a person who may sign a maintenance release in accordance with section 571.11 of the CARs. This distinction will vary according to the type of aircraft and the severity of the incident, and will be primarily governed by the need for a maintenance release. Where there is any doubt regarding the airworthiness of the aircraft, certification by a person who may sign a maintenance release in accordance with section 571.11 of the CARs shall be required prior to flight.

(amended 2007/12/30)

(8) Heavy or Overweight Landings

An aircraft landing gear is designed to withstand landings at a particular aircraft weight and vertical descent velocity. If either of these parameters is exceeded during a landing, it is then probable that some damage can be caused to the landing gear or its supporting structure. Overstressing can also be caused by landing with drift or landing in an abnormal attitude (e.g. nose or tail wheel striking the runway before the main wheels).

Some aircraft have structural elements which are known to give a visual indication that specified "g" forces have been exceeded, but in all cases of suspected heavy landings, the flight crew shall be consulted for details of aircraft weight, fuel distribution, landing conditions and whether any noises indicative of structural failure were heard.

The damage resulting from a heavy landing is normally concentrated around the landing gear, its supporting structure in the wings or fuselage, the wing and stabilizer attachments and the engine mounts. Secondary damage can be found on the fuselage upper and lower skin and structure, and wing skin and structure, depending on the configuration and loading of the aircraft. On some aircraft the manufacturer can recommend that if no damage is found in the

primary areas, the secondary areas need not be inspected; but if damage is found in the primary areas, then the inspection shall be continued.

Because of the number of factors involved, it is not possible to lay down precise details of the inspections which must be made after any incident, on any type of aircraft, but a preliminary inspection shall normally include the items detailed below.

(a) Landing Gear

- (i) Examine tires for creep, flats, bulges, cuts, pressure loss and enlargement.
- (ii) Examine wheels and brakes for fluid leaks, cracks and other damage.
- (iii) Examine axles, struts and stays for distortion and other damage.
- (iv) Check shock struts for fluid leaks, scoring and abnormal extension.
- (v) Examine landing gear attachments for cracks, other damage and signs of movement. In some instances this can require the removal of certain bolts in critical locations, for detailed nondestructive testing.
- (vi) Examine the structure in the vicinity of the landing gear attachments for signs of cracks, distortion, movement of rivets or bolts and fluid leakage.
- (vii) Examine doors and fairings for damage and distortion.
- (viii) Jack the aircraft and carry out retraction and nose-wheel steering tests; check for correct operation of locks and warning lights, clearances in wheel bays, fit of doors and signs of fluid leaks.

(b) Wings

- (i) Examine the upper and lower skin surfaces for signs of wrinkling, pulled rivets, cracks and movement at skin joints. Inertia loading on the wing will normally result in wrinkles on the lower surface and cracks or rivet damage on the upper surface, but stress induced by wing-mounted engines can result in wrinkles on either surface.
- (ii) Check for signs of fuel leaks and seepage from integral tanks.
- (iii) Examine wing root fillets for cracks and signs of movement.
- (iv) Check flying controls for freedom of movement.
- (v) Check balance weights, powered flying control unit mountings and control surface hinges for cracks, and control surfaces for cracks or buckling.
- (vi) Check spars for distortion and cracks.

(c) Fuselage

- (i) Examine fuselage skin for wrinkling or other damage particularly at skin joints and adjacent to wing and landing gear attachments.
- (ii) Examine pressure bulkheads for distortion and cracks.

- (iii) Examine the supporting structure of heavy components such as galley modules, batteries, water tanks, fire extinguishers, auxiliary power units, etc. for distortion and cracks.
- (iv) Check that the inertia switches for fire extinguishers, emergency lights, etc, have not tripped.
- (v) Check instruments and instrument panels for damage and security.
- (vi) Check ducts and system pipelines for leaks and buckling.
- (vii) Check fit of access doors, emergency exits, etc., and surrounding areas for distortion and cracks.
- (viii) Check loading and unloading operation of cargo containers and condition of cargo restraint system.

(d) Engines

- (i) Check engine and propeller controls for full and free movement.
- (ii) Examine engine mounts and pylons for damage and distortion, tubular members for bowing and cracks at welds, mounting bolts and attachments for damage and evidence of movement.
- (iii) Check freedom of rotating assemblies - on piston engines, check freedom of rotation with spark plugs removed.
- (iv) Examine engine cowlings for wrinkling and distortion, and integrity of fasteners.
- (v) Check for oil, fuel and hydraulic fluid leaks.
- (vi) Check propeller shaft for alignment.

(e) Empennage

- (i) Check flying controls for freedom of movement.
- (ii) Examine rudder and elevator hinges for cracks, and control surfaces for cracks and distortion, particularly near balance weight fittings.
- (iii) Examine stabilizer attachments and fairings, screw jacks and mountings for distortion and signs of movement.

(f) Engine Runs

Provided that no major structural distortion has been found, engine runs shall be carried out to establish the satisfactory operation of all systems and controls. A general check for system leaks shall be carried out while the engines are running, and on turbine engines the rundown time shall be checked.

(g) Helicopters

The inspections necessary on helicopters are broadly similar to those detailed in the preceding paragraphs, but additional checks are normally specified for the main rotor

blades, head and shaft, tail rotor and transmission. The inspections outlined below are typical.

- (i) Examine the rear fuselage or tail boom for evidence of strike damage from the main rotor blades, and if damage is found, check for cracks, security, and symmetry.
- (ii) Remove the main rotor blades and examine them for twisting and distortion. Check the surface for cracks, wrinkles or other damage, and check the security of the skin attachment rivets or structural bonding. If the main rotor blades are badly damaged through impact with the tail boom or ground, certain components in the transmission can be shockloaded, and it shall be necessary to refer to the instructions for rotor strikes (see section 13 below).
- (iii) For the main rotor head, disconnect pitch change rods and dampers, and check that the flapping hinges, drag hinges and blade sleeves move freely, without signs of binding or roughness. Examine the rotor head and blade stops for cracks or other damage, and the dampers for signs of fluid leaks. Damage in this area can be an indication of further damage inside the main gearbox.
- (iv) Examine the tail rotor blades for damage and security, and the coning stops for evidence of damage. Damage to the tail rotor blades which is beyond limits shall entail either further inspection, or replacement of the hub, pitch change links, tail rotor gearbox and drive shaft.

(9) Flight in Severe Turbulence

The type of damage that results from flight through severe turbulence is similar to that resulting from a heavy landing, the major difference being that the damage is less localized, and that wheel and brake assemblies are unlikely to be affected.

On some aircraft an indication of the severity of the loads experienced can be obtained from accelerometers or fatigue meters. These instruments, however, are designed to record steady loads, and peak forces recorded during flight through turbulence can be exaggerated due to instrument inertia. Generally, readings outside the range of -0.5 g to $+2.5\text{ g}$ on transport category aircraft are cause for investigation. Most aircraft do not have such instrumentation, and all incidents of flight through severe turbulence shall be investigated.

(amended 2007/12/30)

Severe turbulence can cause excessive vertical or lateral forces on the aircraft structure, and the effects can be increased by the inertia of heavy components such as engines, fuel tanks, water tanks and cargo. Damage can be expected at main assembly points such as the wing to fuselage joints, tail to fuselage joints and engine mountings. Damage can also occur in those areas of the wings, fuselage, stabilizer and control surfaces where the greatest bending moment takes place (i.e. part way along their length, and can be indicated by skin wrinkles, pulled rivets or similar faults).

An inspection for damage after a report of flight through severe turbulence shall include the inspections detailed in Section (8) above, except, in most cases, those covering the landing gear.

Information Note:

Further dismantling and, in some cases, removal of some portions of the skin can be necessary in order to inspect supporting structure where skin damage has been found.

(10) Exceeding of Airspeed/Acceleration Limits

Where it is reported that an aircraft has exceeded its approved airspeed or acceleration limits, the inspection required is the same as that required following flight through severe turbulence.

Where the limit exceeded was that applicable to a particular configuration (e.g. gear or flap extension limits), or where the report relates to failure to observe loading or wing bending relief limits (e.g. application of excessive loads prior to depletion of centre wing tanks), then the subsequent investigation can be limited to the affected areas of the structure.

(11) Burst Tire Incidents

If a tire bursts during taxiing, take-off or landing, fragments of the tire can cause damage to parts of the aircraft in line with the wheel disc. Damage can also occur due to the wheel rolling on the paved runway and transmitting shocks to the landing gear leg and supporting structure.

Multiple wheel landing gears will generally be less seriously affected by a single burst tire, but the axles, bogies, torque links or steering mechanism can become bowed or strained as a result of the effects of uneven loading. In most cases, the wheel on which the burst occurred shall require repair or removal from service.

In addition, the following inspections shall be carried out:

(a) Examine the wheels and tires which have not burst.

Information Note:

Where one of the tires on a multiwheel undercarriage has burst, it can be specified by the aircraft manufacturer that all tires on that leg or axle shall be discarded, or removed for detailed examination.

(b) Examine the brake units on the affected leg for damage. On those wheels which are not fitted with fusible plugs, the tire burst can have resulted from overheating caused by a binding brake, and when the replacement wheel is fitted, attention shall be given to the operation of the associated brake including, in particular, freedom of rotation of the wheel with brake released.

(c) Examine the landing gear bay for damage and hydraulic fluid leaks.

(d) Examine the affected leg, including pipelines, operating jacks, etc., for damage and hydraulic fluid leaks.

(e) Inspect the supporting structure and attachments of the affected leg for cracks, warped panels and loose rivets. In some instances it can be specified that certain highly stressed bolts in the supporting structure or retraction mechanism shall be removed for nondestructive testing.

- (f) Examine the adjacent fuselage or wing skins and landing gear doors for damage.
- (g) Check engines for possible ingestion of debris.

(12) Immersion in Water

The following requirements are based on immersion in non-contaminated water. It is the responsibility of the person specified in section 571.11 of the CARs performing the inspection to determine if any contaminating elements exist, and extend the scope of the inspection as necessary. Examples of contaminants which may have to be taken into consideration include alkali, sulphur, salt, etc. Other important considerations are the length of time the aircraft has been submerged, especially if contaminants exist, and the temperature of the water. If temperatures are below freezing, tubing in the fuselage structure is liable to have been distorted or split through the formation of ice.

(amended 2007/12/30)

The general inspection requirements for aircraft which have been immersed in water are listed below. To them shall be added any additional requirements specified by the manufacturer, and additional inspections for any damage incurred during the entry into the water or during the recovery operation. The inspections listed below are considered the absolute minimum required following short term immersion in uncontaminated water. If the aircraft has been immersed for a period in excess of 30 days (or 24 hrs. in the case of salt water), additional inspections shall be necessary.

(a) Aircraft Structure

- (i) Examine all structure for damage (i.e. skin wrinkles, warping, bulges or splits in tubular structures).
- (ii) Remove or open all inspection panels to allow complete draining and drying. Cabin lining, flooring and side panels shall be opened sufficiently to allow drying and inspection. On fabric covered components, cut sufficient circular holes to allow draining, drying and inspection of the structure. Special attention shall be paid to glued joints on wooden structures.
- (iii) Check tubular structure for trapped water. Examine tape wrappings on tubular frames for thorough drying.
- (iv) Lubricate with grease where fittings are provided, and all other moving parts with light engine oil.
- (v) Drain fuel tanks and lines and flush tanks with a suitable rapidly evaporating solvent.

Information Note:

Maintenance personnel should ensure that the solvents used for flushing have no detrimental effect on the flexible hose construction material.

(b) Instruments

- (i) Remove all instruments, open sufficiently to allow drying. Lubricate and test. All primary flight instruments shall be forwarded to an approved overhaul organization for recertification.
- (ii) Disconnect all lines and drain thoroughly, paying particular attention to low spots where water can be trapped.

(c) Electrical and Avionics Equipment

- (i) Loosen all wire bundles and shielded cables sufficiently to allow complete drying.
- (ii) Check all connections and remove corrosion.
- (iii) Clean switches (open type), solenoids, reverse current relays and voltage regulators (except carbon pile type) with a suitable rapidly evaporating solvent. Carbon pile type voltage regulators shall be returned to an approved overhaul facility.
- (iv) Replace toggle switches and circuit breakers.
- (v) Clean and test all radio units and accessories.

(d) Engines (if immersed while cold)

- (i) Examine engine and propeller for damage. Bent propeller blades shall necessitate the examination of the engine for propeller strike damage.
- (ii) Drain oil from sumps, oil cooler and tank.
- (iii) Drain water from cylinders by rotating crankshaft, with spark plugs removed and lower intake pipes loosened.
- (iv) Drain carburettor, flush with fuel or alcohol, and then flush with very light oil. Injection type carburettors shall be forwarded to an overhaul agency for dismantling, inspection and testing.
- (v) Remove magnetos, drain, oven dry, relubricate and reinstall.
- (vi) Remove all accessories, drain, dry, relubricate and reinstall.
- (vii) Clean spark plugs and ignition harness, dry and test.
- (viii) Drain and replenish oil tank with oil of the correct grade.
- (ix) Start engines, if oil pressure is normal, continue running until operating temperatures are obtained (cylinder head and oil).
- (x) Stop engines and check oil screens.
- (xi) Carry out complete power run and ensure that all applicable specifications are met, and that all accessories are operating normally.

(e) Additional Checks if Engine Immersed while Hot**(i) Piston Engines**

Due to the thermal shock encountered with the sudden cooling of the cylinder assemblies, all cylinders shall be removed and dismantled; cylinders, cylinder heads, pistons, valves, valve seats and valve springs shall be inspected for distortion and cracks.

(ii) Turbine Engines

Turbine engines shall be completely dismantled for internal inspection by an approved turbine engine overhaul organization.

(f) Additional Checks if Engine Immersed while Running**(i) Piston Engines**

Due to the danger of forming a hydraulic lock which can result from the entry of water into the cylinders, the engine shall be completely dismantled for internal inspection by an approved overhaul organization.

(ii) Turbine Engines

Turbine engines shall be completely dismantled for internal inspection by an approved overhaul organization.

(g) Propellers

Cleaned and re-lubricated. Propellers with control domes or cylinders which are removable in the field shall be opened and checked internally.

(13) Propeller and Rotor Strikes

Engines and transmission systems which have been shockloaded as a result of the propeller or rotor striking the ground or some object while the engine is running shall be inspected in accordance with the following paragraphs:

(a) A preliminary inspection shall be made of the blade itself and, if possible, of the object which was struck to aid in estimating the level of shock which can have been transmitted. It is not expected that an accurate assessment be made, but rather that the inspector shall form a general impression of whether the impact was severe or mild. If the level of impact is in doubt, it shall be assumed that a severe shock has been transmitted. In addition to a visual examination, the propeller or rotor shall be checked for correct tracking. Out of track limits shall be found in the appropriate maintenance manual but, as a general guide, a propeller which is out of track by more than 0.125 inch (3,18 mm.) is cause for further investigation. A visual inspection of the reduction gear case for oil leaks or cracks shall also be carried out.

(b) The need for further investigation will depend upon the results of the preliminary examination, and on the assessment by a person specified in section 571.11 of the CARs of the probability of further damage, based on the nature of the incident. If further investigation is indicated, the propeller shaft or flange shall be checked for eccentricity (run

out check). Limits are those specified by the manufacturer. If the propeller shaft or flange is out of limits, an internal inspection shall be required. In the case of a geared piston engine this shall entail removal of the reduction gear for a check of the crankshaft run out. With a direct drive engine the crankcase shall have to be opened and checked for distortion, cracks or other damage. This check shall include the crankshaft damper assemblies. If the impact was severe, consideration shall also be given to the possibility of structural damage due to loads being transmitted through the engine mounts.

(amended 2007/12/30)

(c) In the case of helicopters, the following additional checks shall be made:

- (i) Remove the main rotor blades and examine them for twisting and distortion. Check the surface for cracks, wrinkles or other damage, and check the security of the skin attachment rivets or structural bonding. If the main rotor blades are badly damaged through impact with the tail boom or ground, check the main rotor shaft, pitch change rods and main gear box mounting bolts for cracks and distortion.
- (ii) For the main rotor head, disconnect pitch change rods and dampers, and check that the flapping hinges, drag hinges and blade sleeves move freely without signs of binding or roughness. Examine the rotor head and blade stops for cracks or other damage, and the dampers for signs of fluid leaks. Damage in this area can be an indication of further damage inside the main gearbox.
- (iii) Examine the tail rotor blades for damage and security, and coning stops for evidence of damage. Damage to the tail rotor blades which is beyond limits shall normally entail either inspection or replacement of the hub, pitch change links, tail rotor gear box and drive shaft.
- (iv) Examine tail rotor drive shafts, universal joints, bearings and support structure for cracks and distortion. Check for freedom of rotation.

(14) Lightning Strikes

(a) Lightning strikes usually cause damage at two points on an aircraft:

strike damage where the discharge enters the aircraft; and static discharge damage subsequent to the strike.

Strike damage is generally found at the wing tips, propellers, leading edges of wings and tail unit, and at the fuselage nose, but on some aircraft types other areas can be particularly susceptible, and this information shall be obtained from the appropriate maintenance manual. Static discharge damage can usually be found at wing tips, trailing edges and antennae.

Information Note:

Strike damage is usually in the form of small circular holes in the exterior skin, either in clusters or spread out over a wide area, and often accompanied by burning or discolouration, blisters on radomes and cracks in glass fibre. Static discharge damage is usually in the form of local pitting and burning at trailing edges.

(b) Since both lightning and turbulence occur in thunderstorms, an inspection for lightning damage shall often coincide with an inspection following reported flight through severe turbulence. The areas mentioned in paragraph (a) above shall be examined for signs of strike or static discharge damage, and bonding strips and static discharge wicks shall be examined for burning and disintegration. All control surfaces, including flaps, spoilers and tabs, shall be inspected for damage at their hinge bearings; unsatisfactory bonding can have allowed static discharge and tracking across the bearings, causing burning, break up or seizure. A check for roughness and resistance to movement at each bearing will usually indicate damage at such points. In addition, the following inspections shall be carried out:

- (i) Examine engine cowlings and engines for signs of burning or pitting. If a lightning strike is evident, tracking through the bearings can have occurred, and some manufacturers recommend that the oil filters and chip detectors should be examined for signs of contamination; this check shall be repeated periodically for a specified number of running hours after the occurrence;
- (ii) Examine the fuselage skin and rivets generally for burning or pitting;
- (iii) If the landing gear was extended when the lightning strike occurred, examine the lower parts of the gear for static discharge damage. Check for residual magnetism and demagnetize where necessary;
- (iv) Functionally check the radio and radar equipment, instruments, electrical circuits and flying controls in accordance with the relevant chapters of the maintenance manual. On some aircraft, a bonding resistance check on radomes can also be specified; and,
- (v) Carry out a compass swing.

(15) High Winds or Jet Blast

Considerable damage can be caused to parked aircraft by high winds or by jet blast/prop wash from other aircraft taxiing or running up in the vicinity. Small aircraft are particularly vulnerable to this type of damage, which can be caused by the blast itself or by debris blown into the aircraft. Following such incidents, the aircraft shall be inspected as follows:

- (a) Inspect flying control surfaces for distortion and loose rivets or other signs of internal damage. If the surfaces were unlocked at the time of the incident the control stops, stop cables and surrounding structure should also be checked;
- (b) Inspect the structure generally, including windows, for impact damage such as chips and dents, and examine the air intakes of engines, heat exchangers, cooling ducts, etc. for debris;
- (c) In the case of small aircraft, and particularly where the blast has been strong enough to move the entire aircraft, consideration shall be given to the need for an internal inspection for damaged structural elements and/or a symmetry check of the complete aircraft.

(16) Spillage of Corrosive Substances

The action taken following spillage of a corrosive substance shall depend upon many factors, including the nature of the substance, the location of the spill and the time elapsed between the occurrence and its discovery. In general, the procedure consists of:

(a) Removal of the Spilt Substance

This shall preferably be done by draining at the nearest drain hole but, if this is not possible, a vacuum cleaner can be used, or the spill mopped up with rags. In the case of mercury, the use of a velvet cloth can help to prevent "beading". The use of blowing hoses to disperse corrosive deposits is not recommended, as this will tend to distribute the substance over a wider area. Care shall be taken to avoid contact with the substance (use masks, gloves, goggles, etc.);

(b) Neutralizing the Residue

Acid spills can be neutralized with a bicarbonate of soda solution. Alkaline spills can be neutralized with a boric acid solution. Chlorine can be treated with water to which acetic acid (vinegar) has been added. Litmus paper will indicate when a neutral pH level has been achieved. Mercury spills can be treated by sprinkling calcium sulphide on the affected area, while phosphates, nitrates and carbonates can be treated by the application of bleach or a strong soap solution;

(c) The entire area shall be rinsed with copious amounts of clean water;

(d) Access panels shall be removed, and the aircraft positioned to ensure a flow of fresh air through the affected area;

(e) Radiographic inspection can be required to detect small particles of mercury, or corrosion pits out of the direct line of sight; and

(f) Re-protect the area by painting, lubrication, etc, as applicable.

Information Note:

Depending on the nature of the spill, and the amount of damage caused, it may be necessary to schedule additional follow-up inspections of the area until it can be determined that no danger of further corrosion exists.

(17) Overspeed-overtemp-overtorque Incidents

Manufacturers' manuals usually contain detailed instructions on the procedures to be followed after this type of incident. If no instructions are available, the manufacturer shall be contacted and provided with full details of the incident. Collateral information can be of importance (e.g. in the case of a turbine engine overtemp, the RPM at which the overtemp occurred is usually an important factor).

(18) Misfuelling

The term misfuelling can include filling with contaminated fuel or with fuel of an incorrect grade. The latter is sometimes difficult to detect, as the incorrect fuel can mix with the fuel

already in the tanks, and appear identical to the naked eye. The most common error (and one of the most dangerous) is fuelling piston engined aircraft with jet fuel. Sophisticated analysis techniques are available to detect contamination of this kind, but one method of detection which is readily available in the field is the "kraft paper" test.

This consists of allowing a drop of the suspected fuel to fall on to a sheet of plain brown paper of the type used for grocery bags, and observing the results. Uncontaminated gasoline will evaporate within 1 to 5 minutes (depending on the temperature), leaving an irregularly shaped stain. Fuel containing as little as 2% kerosene can take 15 minutes or longer to evaporate, and will leave a circular stain.

If an aircraft has been refuelled with contaminated fuel, or with the wrong grade of fuel, the action taken will depend primarily upon whether the engine(s) have been operated on the fuel in question. If the misfuelling is detected before the engines have been run, it is merely necessary to ensure that the fuel is drained.

The aircraft (or the affected tanks) shall be completely defuelled, and the tanks drained at the lowest point. With tail wheel equipped aircraft this can entail placing the aircraft in the flying attitude to ensure that no residue of contaminated fuel remains in the lowest part of the tanks. After draining and replenishing with the correct grade of fuel, the engine supply lines shall be flushed, and an engine ground run carried out.

If the engines have been run on the contaminated fuel, the action taken will depend on the type of engine and the nature of the contamination. Turbine engines are generally more tolerant of misfuelling than piston engines, and some turbine engine manufacturers specify that their engines can be run for a certain period of time on aviation gasoline. Reference shall be made to the maintenance manual and the engine type certificate data sheet for details.

Piston engines which have been operated on unapproved fuels can have experienced detonation and shall be inspected for damage which could result. The inspection shall commence with an examination of the spark plugs, valves and valve seats, and the piston crowns. If any damage is detected the engine shall be dismantled completely for internal examination.

(19) Exposure to Volcanic Ash

Volcanic eruptions are rare, but when they do occur the ashes which are ejected can spread over a wide area and can potentially affect a great number of aircraft. Volcanic ash is highly abrasive, and can be acidic. If the particles are ingested by a running engine, they will melt when exposed to combustion chamber temperatures and form a glass-like ceramic coating on internal engine parts.

A number of manufacturers have provided instruction for the treatment of aircraft which have been exposed to volcanic ash, and these instructions shall be followed. In general, they consist of the removal of debris by vacuum cleaner (avoid the use of water, which can combine with the ash to form a cement like substance, and can exacerbate the corrosive effects). Care shall be taken to avoid the scratching of polished surfaces, such as transparencies or the exposed pistons of hydraulic actuators. Air filters shall be changed, and systems which

are open to the atmosphere (pitot static systems, pressure sensing vents, etc.) checked. If the engines were running at the time of the exposure, borescope checks of the internal components shall also be required.

(20) Ingestion of Dry Chemical Extinguishant

Dry chemical extinguishant, if ingested into a running piston engine, can be deposited on the inlet valve stems in the form of a sticky, shellac-like substance. This deposit can cause sticking of the valves and subsequent damage to the engine.

Whenever dry chemical extinguishers are used on an aircraft engine, the induction system and surrounding area shall be thoroughly cleaned prior to engine starting. If any signs of ingestion of powder into the engine are found, the valve stems shall be inspected for deposits, and if necessary, a top overhaul carried out.

(21) Bird Strikes

Reserved

(22) Ground Collisions

Reserved

(23) Other Occurrences

Occurrences not covered in the preceding sections, or peculiar to a particular aircraft type, can also necessitate special inspections, and these are usually specified in the appropriate maintenance manual. Where no specific instructions exist, experience on the type of aircraft, combined with a knowledge of the structure and systems, will normally enable a satisfactory inspection to be carried out.

Information Note:

In cases of doubt, the aircraft manufacturer and/or the local Transport Canada airworthiness office can be consulted.

APPENDIX H - AIRWORTHINESS DIRECTIVES

(1) Responsibilities

Pursuant to CAR 605.84, persons having legal custody and control of aircraft are responsible for ensuring that their aircraft (except for aircraft with Special Certificates of Airworthiness in the Amateur Built or Owner Maintained classifications) are not flown unless they meet the requirements of any *Airworthiness directive* (AD) applicable to the aircraft or their components. Owners and lessees must ensure that:

(amended 2002/03/01)

(a) details of the scheduling provisions of any applicable airworthiness directives relating to the airframe, engine(s), propeller(s), component(s), or any parts thereof, are entered into the applicable technical record; and

(amended 2002/03/01)

(b) the requirements of all such ADs are complied with and, where applicable, entries relating to the compliance are made in the aircraft technical records.

(amended 2002/03/01)

(2) Foreign Airworthiness Directives or Other Equivalent Foreign Notices

CAR 605.84 recognizes the mandatory status of foreign ADs and equivalent notices issued by the aviation authority having jurisdiction over the type design of the aeronautical product. In the case of a conflict between an AD issued by TC and one issued by the foreign aviation authority that has jurisdiction over the type design, the AD issued by TC prevails.

(amended 2002/03/01)

Information Notes:

(i) *Equivalent notices normally take the form of a manufacturer's service bulletin which is prefaced by a statement to the effect that the civil aviation authority having jurisdiction over the type design has declared the bulletin to be mandatory.*

(ii) *In states where the civil aviation authorities issue ADs separately from the applicable service bulletins, aeronautical product manufacturers occasionally mark their service bulletins "mandatory". Such categorization simply indicates the manufacturer's opinion of the importance of the bulletin and has, by itself, no regulatory obligation, even if the bulletins are shown to be approved by those authorities. (The latter approval applies only to the work description section of the bulletins and indicates that the aircraft or component will still conform to its type certificate following the work.) In short, service bulletins themselves are not mandatory unless mandated by the foreign civil aviation authority, or referenced by an AD.*

(amended 2002/03/01)

(iii) *ADs issued by a foreign aviation authority that does not have jurisdiction over the type design of the aeronautical product affected, do not apply in Canada.*

(amended 2002/03/01)

(iv) *Transport Canada (TC) endeavors to transmit to Canadian registered owners the ADs in respect of foreign aeronautical products received from foreign overseeing authorities, and that are accepted by TC. Transport Canada simply advises the registered owners of equivalent notices because the owners are expected to avail themselves of all type certificate holders' instructions for continuing airworthiness.*

(amended 2002/03/01)

(v) *As it is impossible for Transport Canada to know on which aircraft a particular appliance is installed, distribution of ADs on appliances is limited to local Transport Canada Centers (TCC). Therefore, the "Miscellaneous" section of the printed or electronic indices must be browsed to identify those ADs applicable to equipment installed on a particular aircraft.*

(amended 2002/03/01)

(3) Exemptions and Alternative Means of Compliance

(a) Pursuant to CAR 605.84(4), Alternative Means of Compliance (AMOC) with the requirements of an AD may be used only if approved by the Director, Aircraft Certification Branch, Transport Canada, Ottawa, as offering a degree of safety at least equivalent to that offered by compliance with the AD.

(amended 2002/03/01)

Information Note:

The approval mentioned in section (3) is delegated to the Chief, Continuing Airworthiness.

(amended 2002/03/01)

(b) AMOCs may be issued in respect of, but are not necessarily limited to, the following:

(amended 2002/03/01)

- (i) alternative modifications;
- (ii) alternative inspection procedures;
- (iii) alternative maintenance intervals;
- (iv) extensions to compliance deadlines; and
- (v) specified operating procedures or limitations.

Information Notes:

(i) *Foreign ADs are sometimes received late by TC and warrant an extension of compliance deadline prior to their transmission by TC. These foreign ADs are distinctly stamped with a suitable revised effective date, annotated with an AMOC approval number, and signed by the Chief, Continuing Airworthiness.*

(amended 2002/03/01)

(ii) *Information about the existence of any TC approved exemption, or AMOC, is available upon request from the Continuing Airworthiness Division, Ottawa. Details of an AMOC, however, are often proprietary to the owner of that approval, and in all cases will have to be requested directly from that owner.*

(amended 2002/03/01)

(4) Application for Approval of an Exemption or AMOC

(a) Application for exemption from a Canadian or foreign AD and for the requisite AMOC is to be made, in writing, to the local TCC. Under no circumstances shall a request for an exemption to a foreign AD be made directly to a foreign issuing authority.

(amended 2002/03/01)

(b) When submitting an application for an exemption or AMOC, justification shall be provided by the applicant that the requested exemption or AMOC will provide a level of safety equivalent to that of the original AD requirements.

(amended 2002/03/01)

(c) The application shall provide complete details, including:

(amended 2002/03/01)

(i) aircraft type;

(ii) aircraft serial number(s) and registration marks, and where applicable, the engine or the propeller serial number or both;

(amended 2002/03/01)

(iii) owner's name;

(iv) organization making the application with name of contact, if not the owner;

(v) AD number;

(vi) components involved;

(amended 2002/03/01)

(vii) exact details of the proposed change, together with reasons for the application;

(viii) drawings or sketches to clearly describe any repairs or modifications; and

(amended 2002/03/01)

(ix) date by which a reply is required.

(amended 2002/03/01)

(d) Type certificate holders of aeronautical products may apply for an exemption or an AMOC on behalf of the owners of the products. If the request is granted, the type certificate holder will be asked to communicate the information to the owners, together with the approval number and any conditions specified. Exemptions and AMOCs issued through a type certificate holder by the foreign authority who issued the original AD are usually accepted by TC in the same manner as the original directive, and need no confirming approval by TC. However, pursuant to CAR 605.84(2), TC reserves the right to overrule foreign exemptions or AMOC. Approval of an exemption from an AD, or of alternate means of compliance with an AD, shall be indicated in a letter issued by the Chief of Continuing Airworthiness. The letter shall be retained with the aircraft technical records.

(amended 2002/03/01)

Information Note:

Following publication of an AD, the US Federal Aviation Administration (FAA) may occasionally issue an AMOC, either absolutely or in principle, for instance, but not exclusively, by means of a manufacturer's service bulletin. The "in principle" AMOCs sometimes require American aircraft owners to request individual approval from their local FAA office. In such cases, affected Canadian owners who wish to take advantage of the provisions must submit a request to TC. However, the information required by subparagraphs 4(c)(vi), (vii), and (viii) of this appendix may be satisfied by including a copy of the FAA approval document as transmitted by the American manufacturer.
(amended 2002/03/01)

- (e) Transport Canada accepts AMOCs approved by structural Designated Engineering Representatives (DERs) who have been authorized by the FAA.
(amended 2002/03/01)

Information Note:

(amended 2002/03/01)

The U.S. FAA introduced, by Notice N 8110.72 dated 30 March 1998, a delegation of the approval responsibility for AMOCs to the structural DERs working for certain Type Certificate holders. This delegation is limited to repairs and modifications required by ADs specific to the products of the Type Certificate holder. FAA Form 8110-3 is the AMOC approval document and will include the necessary information.
(amended 2002/03/01)

APPENDIX I - SPECIFICATION TABLES

**SCHEDULE 1 -
Position and Anti-collision Light Systems
(Ref. CAR 605.16)**

(amended 2009/12/01)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Type of Aircraft Light	Quantity and Colour of Light Projection	Characteristic	Location	Projection
1. Position Light	1 - Red	steady light	from a source located on the left side or left wing of the aircraft as far outboard as is practicable.	Above and below the horizontal plane of the aircraft through an unobstructed angle from dead ahead to 110° to the left.
2. Position Light	1 - Green	steady light	from a source located on the right side or right wing of the aircraft as far outboard as is practicable.	Above and below the horizontal plane of the aircraft through an unobstructed angle from dead ahead to 110° to the right.
3. Position Light	1 or 2 - White	steady light	from a source located as far aft on the aircraft as possible except that where a single source is impracticable two sources located elsewhere than as far aft on the aircraft as possible may be approved.	Above and below the horizontal plane of the aircraft rearward through an unobstructed angle of 140° equally distributed on the left and right sides.
4. Anti-collision light	1 or more Red, White or Red/White segmented	flashing light (NOTE: Each flashing light, when viewed from a distance, shall exhibit the flashing characteristics specified in the <i>Airworthiness Manual</i>).	from a source, or sources, located in accordance with the requirements set out in the <i>Airworthiness Manual</i> .	In all directions within 30° above and 30° below the horizontal plane of the aircraft in accordance with the requirements set out in the <i>Airworthiness Manual</i> .

**SCHEDULE 2 -
Aeroplane Flight Data Recorder (FDR)
Specifications (Ref CAR 605.33)**

(amended 2009/12/01)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Installed System ¹ Minimum Accuracy (to recovered data)	Sampling interval (in seconds)	Resolution ⁴ Read-out
Relative Time (from recorded on prior to take-off)	8 hour minimum	±0.125% per hour	1	1 sec.
Altitude	-1,000 ft. to maximum certificated altitude of aircraft.	±100 ft. to ±700 ft. (see table 1 CAN-TSO C 51-a) (amended 2009/12/01)	1	25 to 150 ft.
Indicated Airspeed	V _{so} to V _D (KIAS)	±5% or ±10 kts., whichever is greater. Resolution 2 kts. below 175 KIAS	1	1% ³
Magnetic Heading	360°	±5°	1	1°
Vertical acceleration	-3g to +6g	±0.2g in addition to ±0.3g maximum datum	4 (or 1 where peaks, ref. to 1g are recorded)	0.03g
Longitudinal acceleration	±1.0g	±1.5% max. range excluding datums error of ±5%	2	0.8°
Pitch attitude	100% of usable range	±2°	1	0.8°
Roll attitude	±60° or 100% of usable range, whichever is greater	±2°	1	0.8°
Stabilizer trim position or Pitch control position	Full range	±3% unless higher uniquely required	1	1% ³
	Full range	±3% unless higher uniquely required	1	1% ³
Engine power, each engine	Maximum range	±5%	1	1% ³
Fan or N ₁ speed or EPR or cockpit indications used for aircraft certification or Prop. speed and torque (sample once/sec as close together as practicable)			1 (prop speed) 1 (torque)	
Altitude rate ² (need depends on altitude resolution)	±8,000 fpm	±10% Resolution 250 fpm below 12,000 ft. indicated	1	250 fpm below 12,000 ft.
Angle of attack ² (need	-20° to +40°	±2°	1	0.8% ³

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Installed System ¹ Minimum Accuracy (to recovered data)	Sampling interval (in seconds)	Resolution ⁴ Read-out
depends on altitude resolution)	or 100% of usable range			
Radio transmitter keying (discrete)	On/off		1	
Trailing edge flaps (discrete or analog)	Each discrete position (Up, Down, Take-off, Approach) or Analog 0-100% range	$\pm 3^\circ$	1 1	1% ³
Leading edge flaps (discrete or analog)	Each discrete position (Up, Down, Take-off, Approach) or Analog 0-100% range	$\pm 3^\circ$	1 1	1% ³
Thrust reverser, each engine (discrete)	Stowed or full reverse		1	
Spoiler/speedbrake (discrete)	Stowed or out		1	
Autopilot engaged (discrete)	Engaged or Disengaged		1	

Notes for Schedule 2

¹ When data sources are aircraft instruments (except altimeters) of acceptable quality to fly the aircraft, the recording system excluding these sensors (but including all other characteristics of the recording system) shall contribute no more than half of the values in this column.

² If data from the altitude encoding altimeter (100 ft. resolution) is used, then either one of these parameters should be recorded. If however, altitude is recorded at a minimum resolution of 25 feet, then these two parameters can be omitted.

³ Percent of full range.

⁴ This column applies to aeroplanes manufactured after October 11, 1991.

**SCHEDULE 3 -
Aeroplane Digital Flight Data Recorder
(DFDR) Specifications
(Ref. CAR 605.33)
(amended 2009/12/01)**

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Accuracy Sensor Input to DFDR Read-out	Sampling Interval (in seconds)	Resolution ⁴ Read-out
Time (GMT or Frame Counter) (range 0 to 4095, sampled 1 per frame)	24 hrs	±0.125% per hour	0.25 (1 per 4 seconds)	1 sec.
Altitude	-1,000 ft. to maximum certificated altitude of aircraft	±100 ft. to ±700 ft. (See table 1 in CAN-TSO-C51a) (amended 2009/12/01)	1	5 ft. to 35 ft. ¹
Airspeed	50 KIAS to V_{SO} and V_{SO} to $1.2 V_D$	±5%, ±3%	1	1kt
Heading	360°	±2°	1	0.5°
Normal (vertical) acceleration	-3g to +6g	±1% of max range excluding datum error of ±5%	8	0.01g
Pitch attitude	±75°	±2°	1	0.5°
Roll attitude	±180°	±2°	1	0.5°
Radio transmitter keying	On/off (discrete)		1	
Thrust/power on each engine	Full range forward	±2%	1 (per engine)	0.2% ²
Trailing edge flap or cockpit control selection	Full range or each discrete position	±3° or as pilot's indicator	0.5	0.5% ²
Leading edge flap on or cockpit control selection	Full range or each discrete position	±3° or as pilot's indicator	0.5	0.5% ²
Thrust reverser position	Stowed, in transit, and reverse (discrete)		1 (per 4 seconds per engine)	
Ground spoiler position/speed brake selection	Full range or each discrete position	±2% unless higher accuracy required	1	0.2% ²
Marker beacon passage	discrete		1	
Autopilot engagement	discrete		1	
Longitudinal acceleration	±1g	±1.5% max. range excluding datum error of ±5%	4	0.01g

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Accuracy Sensor Input to DFDR Read-out	Sampling Interval (in seconds)	Resolution ⁴ Read-out
Pilot input and/or surface position—primary controls (Pitch, Roll, Yaw)	Full range	±2° unless higher accuracy uniquely required	1	0.2% ²
Lateral acceleration	±1g	±1.5% max. range excluding datum error of ±5%	4	0.01g
Pitch trim position	Full range	±3% unless higher accuracy uniquely required	1	0.3% ²
Glideslope deviation	±400 Microamps	±3%	1	0.3% ²
Localizer deviation	±400 Microamps	±3%	1	0.3% ²
AFCS mode and engagement status	discrete		1	
Radio altitude	-20 ft. to 2,500 ft.	±2 ft. or ±3% whichever is greater below 500 ft. and ±5% above 500 ft	1	1 ft. + 5% ² above 500 ft.
Master warning	discrete		1	
Main gear squat switch status	discrete		1	
Angle of attack (if recorded directly)	As installed	As installed	1	0.3% ²
Outside air temperature or total air temperature	-50°C to +90°C	±2°C	1	0.3°C
Hydraulics, each system low pressure	discrete		0.5	0.5% ²
Groundspeed	As installed	Most accurate system installed (IMS equipped a/c only)	1	0.2% ²
If additional recording capacity is available, recording of the following parameters is recommended. The parameters are listed in order of significance:				
Drift Angle	When available. As installed.	As installed	4	
Wind Speed and Direction	When available. As installed.	As installed	4	
Latitude and Longitude	When available. As installed.	As installed	4	
Brake pressure/Brake pedal position	As installed	As installed	1	
Additional engine parameters:				
EPR	As installed	As installed	1 (per engine)	
N1	As installed	As installed	1 (per engine)	
N2 EGT	As installed	As installed	1 (per engine)	

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Accuracy Sensor Input to DFDR Read-out	Sampling Interval (in seconds)	Resolution ⁴ Read-out
EGT	As installed	As installed	1 (per engine)	
Throttle Lever Position	As installed	As installed	1 (per engine)	
Fuel Flow	As installed	As installed	1 (per engine)	
TCAS				
TA	As installed	As installed	1	
RA	As installed	As installed	1	
Sensitivity level (as selected by crew)	As installed	As installed	2	
GPWS (ground proximity warning system).	Discrete		1	
Landing gear or gear selector position	Discrete		0.25 (1 per 4 seconds)	
DME 1 and 2 Distance	0 - 200 NM	As installed	0.25	1 mile
Nav 1 and 2 Frequency Selection	Full range	As installed	0.25	

Notes for Schedule 3

¹ When altitude rate is recorded. Altitude rate must have sufficient resolution and sampling to permit the derivation of altitude to 5 feet.

² Percent of full range.

³ For airplanes that can demonstrate the capability of deriving either the control input on control movement (one from the other) for all modes of operation and flight regimes, the "or" applies. For aeroplanes with non-mechanical control systems (fly-by-wire) the "and" applies. In aeroplanes with split surfaces, suitable combination of inputs is acceptable in lieu of recording each surface separately.

⁴ This column applies to aeroplanes manufactured after October 11, 1991.

SCHEDULE 4 - Helicopter Flight Data Recorder (FDR) Specifications

(amended 2009/12/01)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Installed System ¹ Minimum Accuracy (to recovered data)	Sampling Interval (in seconds)	Resolution ³ Read out
Relative Time (from recorded on prior to take-off)	8 hour minimum	±0.125% per hour	1	1 sec.
Indicated Airspeed	V _a in to V ₀ (KIAS) (minimum airspeed signal attainable with installed pitot-static system).	±5% or ±10 kt., whichever is greater.	1	1 kt.
Altitude	-1,000 ft. to 20,000 ft. pressure altitude	±100 ft. to ±700 ft. (see table 1 in CAN-TSO-C51a) (amended 2009/12/01)	1	25 to 150 ft.
Magnetic Heading	360°	±5°	1	1°
Vertical acceleration	-3g to +6g	±0.2g in addition to ±0.3g maximum datum	4 (or 1 per second where peaks, ref. to 1g, are recorded)	0.05g
Longitudinal acceleration	±1.0g	±1.5% max. range excluding datums error of ±5%	2	0.03g
Pitch attitude	100% of usable range	±2°	1	0.8°
Roll attitude	±60° or 100% of usable range, whichever is greater	±2°	1	0.8°
Altitude Rate	±8,000 fpm	±10% Resolution 250 fpm below 12,000 ft. indicated	1	250 fpm below 12,000
Engine Power, Each Engine				
Main rotor speed	Maximum range	±5%	1	1% ²
Free or power turbine	Maximum range	±5%	1	1% ²
Engine Torque	Maximum range	±5%	1	1% ²
Flight Control, Hydraulic Pressure				
Primary (discrete)	High / Low		1	
Secondary if applicable (discrete)	High / Low		1	

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Installed System ¹ Minimum Accuracy (to recovered data)	Sampling Interval (in seconds)	Resolution ³ Read out
Radio transmitter keying (discrete)	On / Off		1	
Autopilot engaged (discrete)	Engaged or disengaged		1	
SAS status - engaged (discrete)	Engaged / disengaged		1	
SAS fault status (discrete)	Fault / OK		1	
Flight Controls				
Collective	Full range	±3%	2	±1% ²
Pedal position	Full range	±3%	2	±1% ²
Lateral cyclic	Full range	±3%	2	±1% ²
Longitudinal cyclic	Full range	±3%	2	±1% ²
Controllable stabilator position	Full range	±3%	2	±1% ²

Schedule 4 Notes:

¹ When data sources are aircraft instruments (except altimeters) of acceptable quality to fly the aircraft, the recording system (excluding these sensors, but including all other characteristics of the recording system) shall contribute no more than half of the values in this column.

² Percent of full range.

³ This column applies to helicopters manufactured after October 11, 1991.

SCHEDULE 5 - Helicopter Digital Flight Data Recorder (DFDR) Specifications

(amended 2009/12/01)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Accuracy Sensor Input to DFDR Readout	Sampling Interval (in seconds)	Resolution ² Read-out
Time (GMT)	24 hrs	±0.125% per hour	0.25 (1 per 4 seconds)	1 sec.
Altitude	-1,000 ft. to maximum certificated altitude of aircraft	±100 ft. to ±700 ft. (See table 1 in CAN-TSO-C51a) (amended 2009/12/01)	1	5 ft. to 30 ft.
Airspeed	As the installed measuring system	±3%	1	1kt
Heading	360°	±2°	1	0.5°
Normal (vertical) acceleration	-3g to +6g	±1% of max range excluding datum error of ±5%	8	0.01g
Pitch attitude	±75°	±2°	2	0.5°
Roll attitude	±180°	±2°	2	0.5°
Radio transmitter keying	On/off (discrete)		1	0.25 sec.
Power in each engine: Free power turbine speed and engine torque	0 - 130% (power turbine speed) Full range (torque)	±2%	1 speed, 1 torque per engine	0.2% ¹ to 0.4% ¹
Main Rotor Speed	0 - 130%	±2%	2	0.3% ¹
Altitude rate	±6,000 ft/min	As installed	2	0.2% ¹
Pilot Input - primary controls (collective, longitudinal cyclic, lateral cyclic, pedal)	full range	±3%	2	0.5% ¹
Flight control hydraulic pressure low	discrete, each circuit		1	
Flight control hydraulic pressure selector switch position, 1 st & 2 nd stage	discrete		1	
AFCS Mode & engagement status	discrete (5 bits necessary)		1	
Stability Augmentation System engage	discrete		1	
SAS Fault status	discrete		0.25	

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Parameters	Range	Accuracy Sensor Input to DFDR Readout	Sampling Interval (in seconds)	Resolution ² Read-out
Main Gearbox Temperature Low	As installed	As installed	0.25	0.5% ¹
Main Gearbox Temperature High	As installed	As installed	0.5	0.5% ¹
Controllable Stabilator Position	full range	±3%	2	0.4% ¹
Longitudinal acceleration	±1g	±1.5% of max range excluding datum error of ±5%	4	0.01g
Lateral acceleration	±1g	±1.5% of max range excluding datum error of ±5%	4	0.01g
Master Warning	discrete		1	
Nav 1 and 2 frequency selection	full range	As installed	0.25	
Outside Air Temperature	-50° C to +90° C	±2°C	0.5	0.3° C

Notes for Schedule 5:¹ Percent of full range.² This column applies to helicopters manufactured after October 11, 1991.

